

Agawam, Massachusetts

Stormwater Master Plan

Funded by the Massachusetts Municipal Vulnerability Preparedness Grant Program

June 2021

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EXECUTIVE SUMMARY

The Town of Agawam (Town) applied for, and received, a Municipal Vulnerability Preparedness (MVP) Action Grant from the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA), in June 2020, to fund the development of a comprehensive Stormwater Master Plan (Master Plan). The MVP program supports a community-led planning process which aims to identify climate change vulnerabilities, prioritize critical actions, and build community resiliency. The Master Plan was identified as a top priority project during the community led Community Resilience Building (CRB) workshop in March of 2020.

Project Purpose

The purpose of this Master Plan is to address community concern regarding chronic and intensifying flooding that impairs normal and emergency roadway access during storm events. In the face of changing climate patterns that are increasing the frequency and severity of rainfall, the Town proposes to develop a long-term plan to sustainably manage its stormwater assets, reduce impervious cover, and promote green infrastructure to provide environmental and public health benefits. This Master Plan provides recommendations for priority projects and an implementation schedule to be incorporated into the Town's Capital Improvements Plan (CIP).

Climate Impact Assessment

A climate impact assessment was conducted to quantify the expected changes in precipitation intensity and frequency, identify vulnerable areas and infrastructure within the Town of Agawam, as well as inform the prioritization of future drainage system improvements. The climate impact assessment considers critical facilities and infrastructure that are at greatest risk and would have the greatest impact if they fail. Additionally, the climate impact assessment incorporates information related to the changes in precipitation that are being reviewed by the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Advisory Committee as of 2021. The results of the climate impact assessment were used to inform the recommendations developed as part of the culvert condition assessment, storm drain infrastructure assessment, detention basin retrofit survey, and the impervious area mitigation strategy. **Table ES-1** below shows the projected change in precipitation expected based on climate change versus the current precipitation data used by the Town. The entire climate impact assessment is provided as **Appendix A**.

Table ES-1:Precipitation Data – NOAA14+ Adjusted for Climate Change

Rainfall Event (return period, present day)	TP40[1]	NOAA14+ [2] Baseline (inches)	30-year Planning Period (2050)		50-year Planning Period (2070)	
	inches		% increase[3]	Inches	% increase[3]	Inches
10-year	4.5	5.73	13%	6.47	22%	6.99
25-year	5.3	7.55		8.53		9.21
100-year	6.7	10.62		12.00		12.96

[1] Existing Precipitation Data used by Agawam. [2] Proposed Precipitation Data under MassDEP consideration. [3] Percent increase applied to NOAA14+ baseline values for each 24-hr design storm depth in accordance with RMAT Tier 2 Methodology: 13% for Mid-Century Planning Horizon (2030, 2050) and 22% for Late-Century Planning Horizon (2070, 2100).

Town-Identified Capital Projects

Prior to receiving the MVP Action Grant, the Town had identified sixteen (16) projects that should be addressed over the next 5 to 10 years. These projects were identified by the Town's Department of Public Works (DPW), Engineering Department staff, and by residents via the Town's interactive GIS Application for reporting issues related to the storm drain network, which is further described in **Section 6.1** of this Master Plan.

Of the sixteen (16) projects, four (4) have been advanced by the Town to preliminary planning or conceptual design phases. The remaining twelve (12) projects are in various stages of planning and were not investigated during the development of this Master Plan but are incorporated into the CIP. The list of projects is provided in **Section 3** of this Master Plan.

Infrastructure Assessment

To develop recommendations for capital planning projects, a climate impact assessment, culvert condition assessment, storm drain infrastructure assessment, detention basin assessment, and an impervious area mitigation assessment were conducted. The total infrastructure assessed in this Master Plan is summarized in **Table ES-2** below.

Table ES-2: Infrastructure Assessed

Infrastructure Type	Total Assessed
Culverts	148
Storm Drain	20,200 LF
Detention Basins	59

The results of the assessments and capital improvements strategy are described throughout this Master Plan and in the associated Appendices.

Local Regulations Review

An impervious area mitigation strategy was prepared to identify opportunities to reduce the negative effects impervious areas have on the Town's natural resources. The three (3) main strategies for impervious area mitigation include:

- Impervious area removal,
- Impervious area disconnection, and
- Impervious area impact reduction (in situations where removal and disconnection are infeasible)

Various methods to achieve one of the three (3) strategies above were identified and are intended to help the Town advance its goals of protecting their water resources, implementing sustainable and resilient practices in the face of climate change, and maintaining the safety and wellbeing of Agawam's residents and visitors. The impervious area mitigation strategy is provided as **Appendix E**.

In addition to the impervious area mitigation strategy recommendations, an audit of existing Municipal Code was conducted to identify what updates may be needed to encourage sustainable and resilient development. A review of Municipal Code was conducted by the Pioneer Valley Planning Commission (PVPC) which included the development of a new Green Streets and Infrastructure Policy to govern all public projects, a new stormwater ordinance, and amending existing development standards to address private new development and redevelopment projects. The summary of the code audit is provided as **Appendix F**.

Municipal Separate Storm Sewer System (MS4) General Permit Compliance Program

The Municipal Separate Storm Sewer System (MS4) consists of stormwater infrastructure that is separated from sewer infrastructure and discharges directly to land or waterbodies instead of a wastewater treatment plant. As a community that owns and operates separate stormwater infrastructure, the Town of Agawam is subject to the requirements of the

2016 Massachusetts Small MS4 General Permit (MS4 General Permit), which is structured around the following six Minimum Control Measures:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control
5. Post-Construction Stormwater Management
6. Pollution Prevention and Good Housekeeping

The stormwater infrastructure assessments and CIP recommendations completed as part of this Master Plan align with and support compliance with the MS4 General Permit. References to the MS4 General Permit are provided in **Section 1.3** of this Plan to identify where the Town can satisfy the requirements of the Permit while also addressing its stormwater infrastructure needs.

Capital Improvement Plan

Of the infrastructure assessed in this planning process, forty-one (41) projects were identified as the highest priority with an estimated construction cost of $20,715,000 in 2021 dollars. These projects are intended to mitigate impacts of a changing climate, prolong the useful life of existing storm drain infrastructure, improve the condition of deteriorating infrastructure, and address known flooding issues. The Town identified sixteen (16) capital improvement projects to address known flooding issues, three (3) of which were identified and assessed during this planning process. The remaining thirteen (13) town-identified capital projects were added to the CIP to address known flooding issues. These thirteen (13) projects are discussed in **Section 3** of this Plan and add an additional estimated construction cost of$9,660,000 in 2021 dollars.

The recommendations herein were developed with a ten (10)-year planning horizon based on estimated funds available to the Town and are summarized in **Tables ES-3** and **ES-4** below. Individual CIP project sheets for each of the priority projects are found in **Appendix G.**

Table ES-3: Capital Improvement Projects and Estimated Cost

Project	No. of Projects	Opinion of Probable Cost (2021 $)
Master Plan Identified Capital Projects	41	$20,715,000
Town Identified Capital Projects	13	$9,660,000
TOTAL	**54**	**$30,375,000**

Projects included in the CIP include culvert, storm drain, and detention basin rehabilitation projects identified through the assessments and discussions with town. In addition, public outreach projects have been added that aim to educate the public about the importance of maintaining infrastructure and ways to mitigate impervious area on privately owned properties. Lastly, recommendations have been provided in this plan for reoccurring annual fund allocations, indented to advance assessments, designs, and construction of various infrastructure improvements. A breakdown of the capital

improvement project costs based on project type is provided in **Figure ES-1** below and further described in **Section 8** of this Plan.

Figure ES-1: Capital Improvement Project Type Breakdown

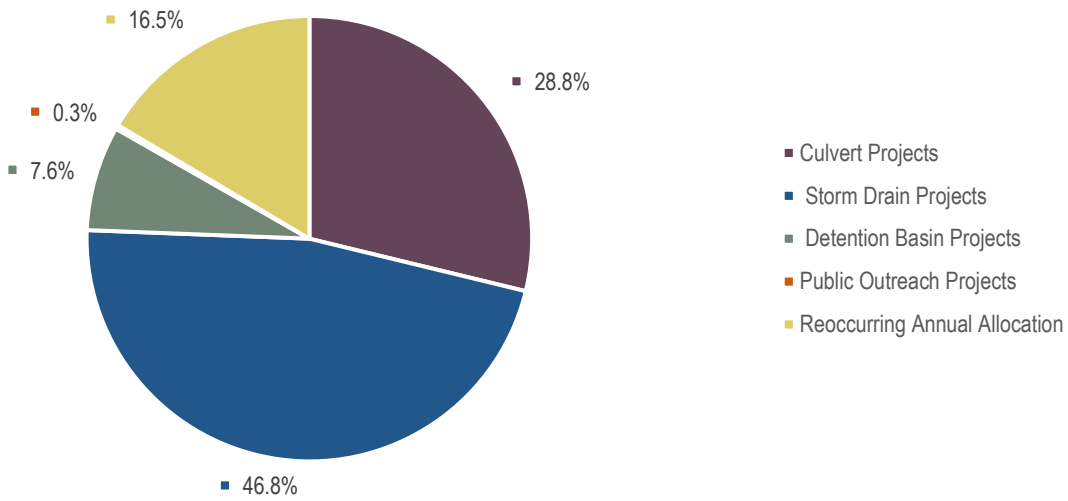


Table ES-4: Annual Estimated Capital Funding Needs

Year	Annual Allocations (2021 $)	Miscellaneous Expenditures (2021 $)	Final Design & Construction Allocation (2021 $)	Annual Estimated Funds (2021 $)
1	$500,000	$200,000	$600,000	$1,300,000
2	$500,000	$200,000	$1,100,000	$1,800,000
3	$500,000	$200,000	$1,600,000	$2,300,000
4	$500,000	$200,000	$2,100,000	$2,800,000
5	$500,000	$200,000	$2,600,000	$3,300,000
6	$500,000	$200,000	$2,800,000	$3,500,000
7	$500,000	$200,000	$2,950,000	$3,650,000
8	$500,000	$200,000	$3,050,000	$3,750,000
9	$500,000	$200,000	$3,200,000	$3,900,000
10	$500,000	$200,000	$3,375,000	$4,075,000
Total	**$5,000,000**	**$2,000,000**	**$23,375,000**	**$30,375,000**

1. INTRODUCTION

The Town of Agawam (Town) applied for, and received, a Municipal Vulnerability Preparedness (MVP) Action Grant from the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) to fund the development of a comprehensive Stormwater Master Plan (Master Plan). The MVP program supports a community-led planning process which aims to identify climate change vulnerabilities, prioritize critical actions, and build community resiliency. This Master Plan aims to address expressed community concern regarding chronic and intensifying flooding resulting from climate change is developed to address one of four top community priority actions identified in Agawam's MVP Summary of Findings, prepared in March 2020 following a Community Resilience Building (CRB) workshop.

This Master Plan also includes recommendations to inform the Town's capital planning activities to sustainability manage the Town's stormwater assets, reduce impervious cover, and promote green infrastructure to provide accessory environmental and public health benefits. In addition to identifying future projects to address climate change concerns in Town, this Master Plan considers ongoing work related to the Town's Municipal Separate Storm Sewer System (MS4) Permit compliance program and align the Capital Improvement Plan (CIP) with compliance obligations in and future water quality needs.

To develop this Master Plan and recommendations for capital planning, the Town contracted with Woodard & Curran, Inc. (Woodard & Curran) to conduct a climate impact assessment, culvert condition assessment, storm drain infrastructure assessment, and detention basin retrofit survey, and develop an impervious area mitigation strategy. The results of the assessments, survey, and strategy are described throughout this Master Plan.

1.1 Background

The Town's focus on climate resilience and adaptation strategies is based on expressed community concern, a string of extreme weather events, and growing awareness of the vulnerability of drainage infrastructure to damages and a loss of capacity over time. As with most municipalities, the Town's drainage infrastructure has been constructed over time under varying design standards. Design of this infrastructure is governed by the Town's Design Standards for Drainage and has historically been based on a 1972 report that Town staff have stated is no longer used. The design capacity of the system is unclear, although the Town and design engineers have historically used the 1961 Technical Paper 40 (TP40) to estimate runoff.

Agawam has learned to expect localized debris, erosion, and roadway flooding on at least an annual basis. Examples of recent disruptive weather events include "Snowtober" in October of 2011, which caused a town-wide power outage for up to five (5) days, Hurricane Irene in August of 2011, which caused erosion on the Westfield River and failure of a 250-foot section of levee sheet pile, and extreme wind events in 2006, 2011, and 2013. The Town's Hazard Mitigation Plan, developed in 2016 by the Pioneer Valley Planning Commission (PVPC), identifies three major sources of flooding:

- Continental storms that typically bring low-pressure from the west and occur throughout the year.
- Coastal storms, also known as nor'easters, that usually come from the south in late summer or early fall. Nor'easters may include occasional hurricanes, and typically generate very large amounts of rainfall.
- Thunderstorms that typically form on warm, humid summer days, generate locally intense rainfall that may last several hours. These storms can form quickly and are difficult to predict.

1.2 Known Drainage Issues

The Town developed an online interactive map for residents to access and report issues as part of a public engagement effort to evaluate stormwater funding needs in 2017. Using the online interactive map, residents directly reported

flooding issues or stormwater-related issues at fifty-five (55) locations throughout the Town, the majority of which were not concentrated near or within the mapped Federal Emergency Management Agency (FEMA) Special Flood Hazard Areas (SFHAs). Resident-reported flooding can be classified into three categories:

- Blocked inlet causing street flooding;
- High stream or river water level; and
- Septic failure from a rising ground water table.

Prior to beginning work on this Master Plan, the Town identified several problem areas in the drainage system. These problem areas require further investigation that may not have been conducted as part of this Master Plan. **Section 3** of this plan describes these known problem areas in more detail.

The resident-reported local flood events and other recent events in nearby communities have reinforced urgency for climate adaptation and compelled municipalities like Agawam to proactively plan and mitigate potential risks through a community driven process. Ultimately Agawam's efforts will reduce the exposure and vulnerability of its citizens, infrastructure, and ecosystems. This work also contributes to the greater climate resilience of the entire Pioneer Valley region.

1.3 Municipal Separate Storm Sewer System (MS4) General Permit Compliance Support

The Municipal Separate Storm Sewer System (MS4) is defined by the U.S. Environmental Protection Agency (EPA) as a conveyance or system of conveyances owned by a state, city, town, or other public entity that discharges to waters of the U.S and is:

- Designed or used for collecting or conveying stormwater;
- Not a combined sewer; and
- Not part of a publicly-owned treatment works.

In the Town of Agawam, stormwater runoff discharges that are conveyed by the MS4 to the environment are regulated under the Clean Water Act and require a permit. Agawam is one of thousands of communities and institutions across the country that must comply with these regulations. The stormwater drainage system discharge permit is known as the "MS4 General Permit" and is issued and managed by both the EPA and the State of Massachusetts Department of Environmental Protection (MassDEP).

The Town of Agawam has had MS4 Permit coverage since 2003. As part of the permitting requirements, MS4 General Permit requirements are summarized as follows:

1. Public Education and Outreach: Implement public outreach programs to help Town residents, business owners, and developers understand their role in keeping stormwater clean.
2. Public Involvement and Participation: Engage the public in decision-making throughout the program.
3. Illicit Discharge Detection and Elimination: Find and fix leaky or unauthorized sanitary sewer lines that might be discharging into the drainage system.
4. Construction Site Stormwater Runoff Control: Ensure that construction projects do not pollute runoff with sediments and debris.

5. Post-Construction Stormwater Management: Ensure that new development and redevelopment control and treat runoff before it leaves the property.

6. Pollution Prevention and Good Housekeeping: Engage in pollution prevention actions like road and parking area best practices (cleaning drainage systems and sweeping pavements), and ensure that municipal activities like vehicle washing, lawn maintenance, and materials storage do not contribute to stormwater pollution.

The stormwater infrastructure assessments and CIP recommendations completed as part of this Master Plan align with and support compliance with the MS4 General Permit. This information is summarized in **Table 1-1** to reference sections of the Master Plan and the MS4 General Permit requirements they support; either as part of work completed or recommendations for future work.

Table 1-1: Master Plan Components that Support MS4 General Permit Compliance

MS4 General Permit Minimum Control Measure	Supporting Component in Master Plan
1. Public Education and Outreach	**Section 8.2.3:** Discusses the role of public outreach to support the implementation of projects, highlights work completed as part of the MVP Project, and includes recommendations for continued efforts.
2. Public Involvement and Participation	**Section 8.2.3:** Discusses the public participation activities completed as part of the MVP Project and the need to solicit participation as part of future projects.
3. Illicit Discharge Detection and Elimination	**Section 5:** Discusses storm drain infrastructure assessments, CCTV inspection data, and outfall screening data for illicit discharges at the Town's 355 outfalls. This information can be used to support future catchment investigations.
4. Construction Site Stormwater Runoff Control	**Section 8.1.1** and **Appendix F:** Municipal Code Review.
5. Post-Construction Stormwater Management	**Section 6.3.3** and **Appendix D;** and **Section 7.2** and **Appendix E:** discuss retrofit opportunities for detention basins and impervious areas to support requirements to assess municipal properties and existing stormwater management facilities for retrofits to improve water quality. **Section 8.1.1** and **Appendix F:** Municipal Code Review.
6. Pollution Prevention and Good Housekeeping	**Sections 4 - 6** and **Appendices B - D:** evaluate the condition of the storm drain infrastructure to support capital improvement projects and rehabilitation or maintenance projects.

1.4 Development of Capital Improvement Projects

In addition to completing assessments of the existing infrastructure and developing regulatory strategies to improving the Town's resiliency, this Master Plan includes an opinion of probable cost (OPC) and CIP summary sheets for projects identified through the development of this Plan. These projects are intended to mitigate impacts resulting from climate change, maintain existing storm drain infrastructure, improve the condition of deteriorating infrastructure, and address known flooding issues throughout the Town. Of all the infrastructure assessed in this Master Plan, forty-one (41) priority capital improvement projects were identified and included in the CIP. The Town identified sixteen (16) capital improvement projects to include in the CIP to address known flooding and structural deterioration issues, three (3) of which were identified and assessed during this planning process. All sixteen (16) projects are further described in **Section 3** of this Plan. Each of the projects are further described, including the project name, location, status, and estimated OPC in **Appendix G**.

1.4.1 *Development of Opinion of Probable Costs*

Woodard & Curran developed and OPC for each of the capital improvement projects identified. Depending on the stage of development each project is in, the OPC includes survey, engineering, construction, and contingency estimates. Cost estimates for projects in the planning and conceptual stage were largely developed using the Massachusetts Department of Transportation (MassDOT) Construction Project Estimator, which provides a preliminary estimate based on current bid item data throughout the state of Massachusetts. These materials include pipes, catch basins, manholes, curbing, sidewalks, paving and other structures. For these projects, Woodard & Curran estimated probably quantities of materials and estimated duration of construction using limited data collected in the field and through desktop analyses.

More comprehensive OPCs have been developed for projects in the design and shovel ready phases since more information about these projects are known as compared to those projects in the planning or conceptual phase. For these types of projects, Woodard & Curran utilized in-house construction cost estimators that consider labor and material costs based on actual site conditions and market trends. These estimates are more detailed because actual site information, such as topography and geotechnical conditions, at the site and general project design are known.

2. CLIMATE IMPACT ASSESSMENT

Woodard & Curran developed a climate impact assessment to quantify the expected changes in precipitation intensity and frequency, identify vulnerable areas and infrastructure within the Town, and inform the prioritization of future drainage system improvements. The climate impact assessment considers critical facilities and infrastructure that are at greatest risk and would have the greatest impact if they fail. Additionally, the climate impact assessment incorporates information related to the changes in precipitation that are being reviewed by the MassDEP Stormwater Advisory Committee. The results of the climate impact assessment were used to inform the recommendations developed as part of the culvert condition assessment, storm drain infrastructure assessment, detention basin retrofit survey, and the impervious area mitigation strategy. The following sections present the summary of the climate impact assessment. The entire climate impact assessment is provided as **Appendix A**.

2.1 Climate Change

2.1.1 *Climate History and Trends*

Agawam lies in the Connecticut River Basin within Hampden County, where projections from the Northeast Climate Adaptation Science Center (NECASC) show that by the end of this century, communities could see more than 7 inches of additional rainfall per year over a 1971-2000 baseline of 46.4 inches per year. The winter season is expected to experience the greatest seasonal increase both in total precipitation and frequency of heavy downpours, or days receiving precipitation over one inch. Projections also suggest that summers may be drier and there will be an increase in series of days without any rain at all. Historic and projected precipitation trends for Hampden County, Massachusetts are presented in **Figure 2-1**.

With regards to temperatures, NECASC projections show that annual average and maximum temperatures will continue to rise. Even a very small rise in average temperatures can cause major changes in other factors, including impacts on species and ecosystem health and the relative proportion of precipitation that falls as rain or snow. Projections from the NECASC indicate a 300% (34.74-day) increase in 90-degree days/year on average by the end of the century from a baseline average of 6 days per year. Generally, extreme heat is over 90 °F, because at temperatures above that threshold, heat-related illnesses and mortality show a marked increase. Historic and projected temperature trends for Hampden County, Massachusetts are presented in **Figure 2-2**.

Finally, projections indicate an increase in the frequency and magnitude of extreme weather. This could come in the form of tropical storms, or other high intensity wind and rain events. Here, too, the greatest changes will occur in the spring and winter.

Figure 2-1: Historic and Projected Precipitation Trends in Hampden County (Resilient MA)

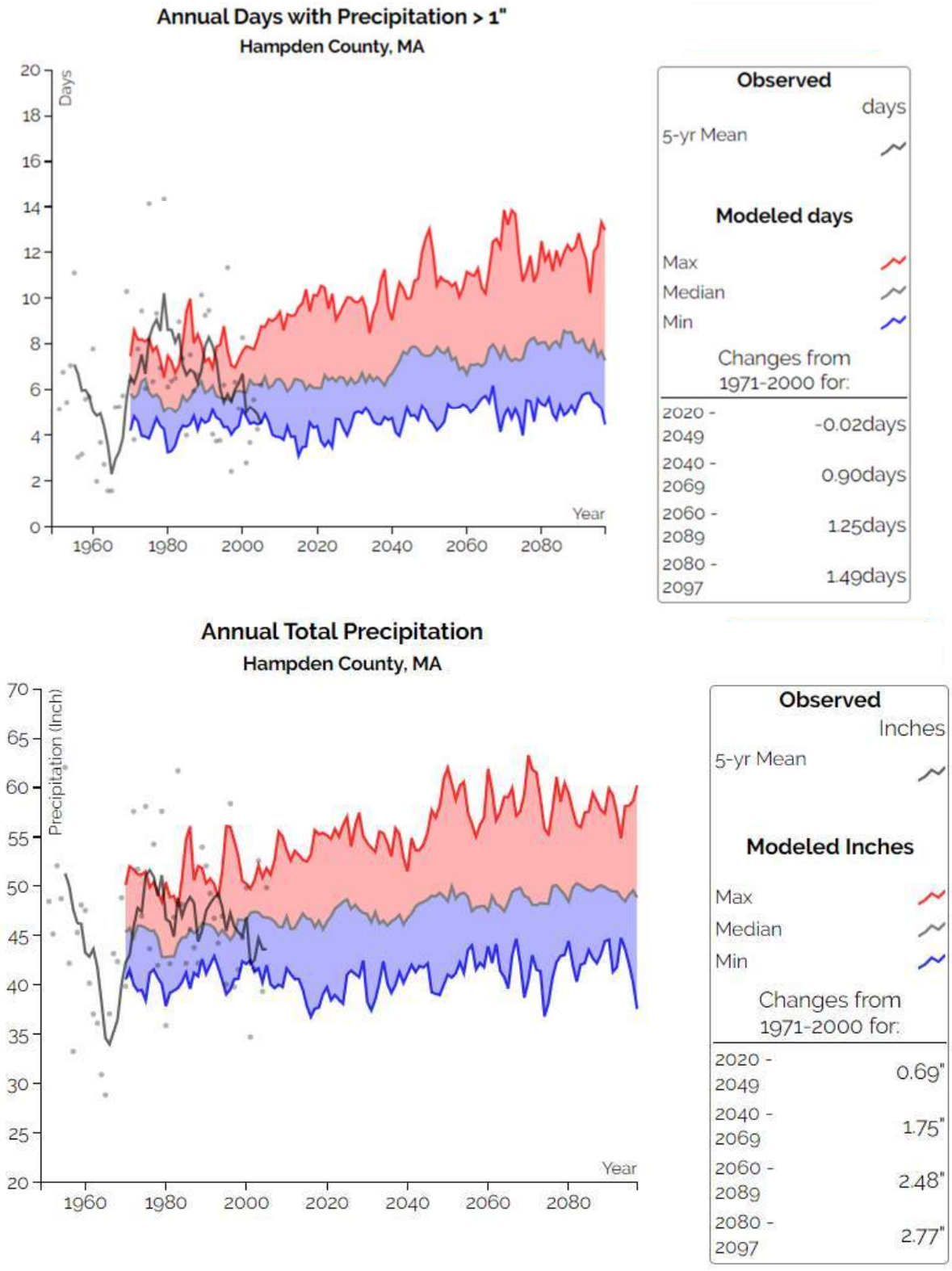
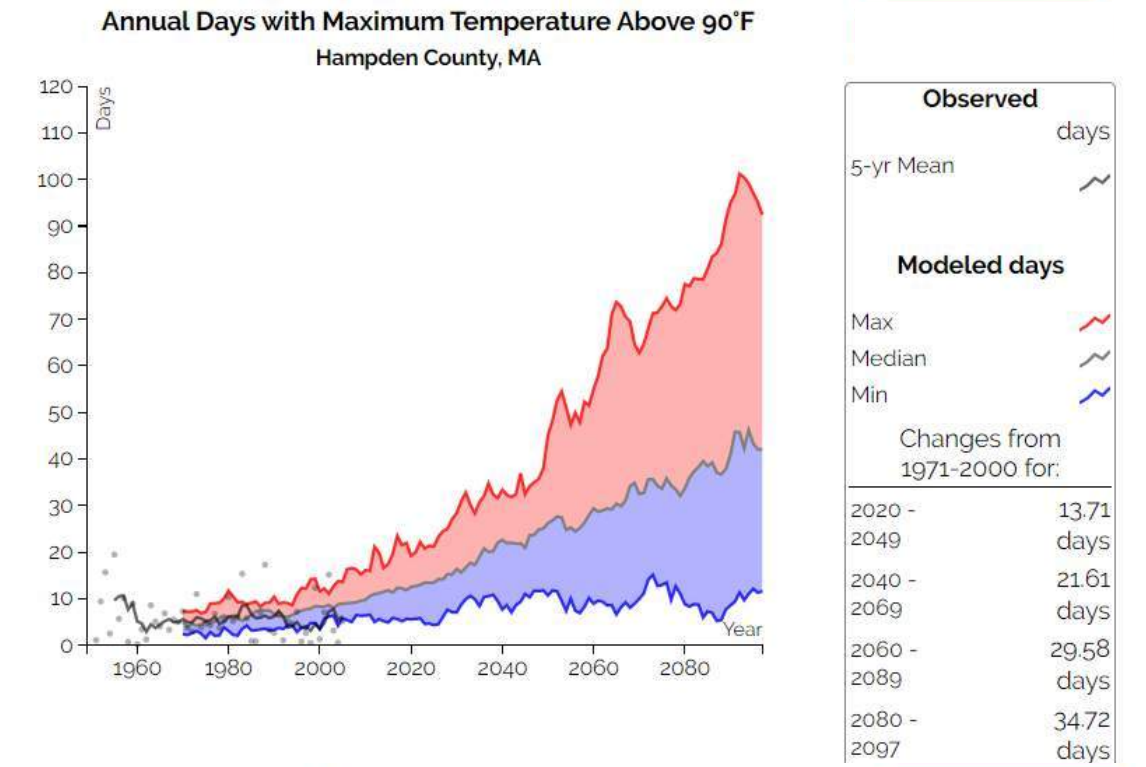
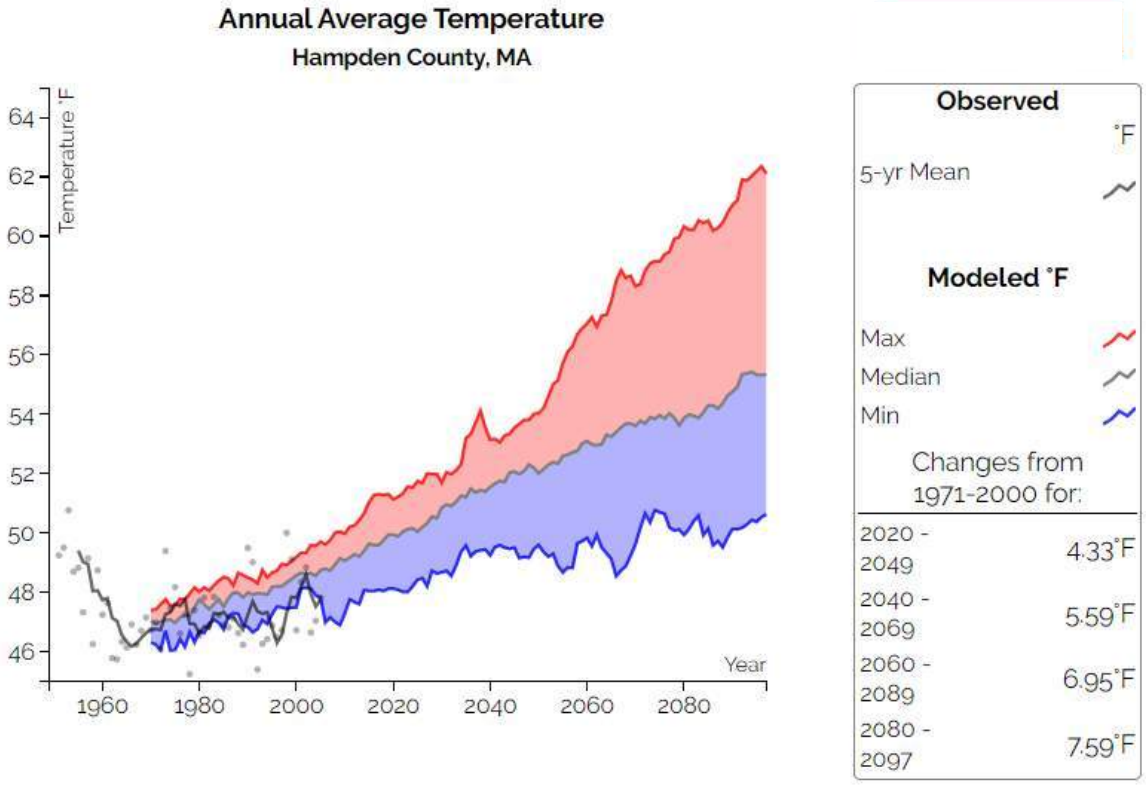


Figure 2-2: Historic and Projected Temperature Trends in Hampden County (Resilient MA)

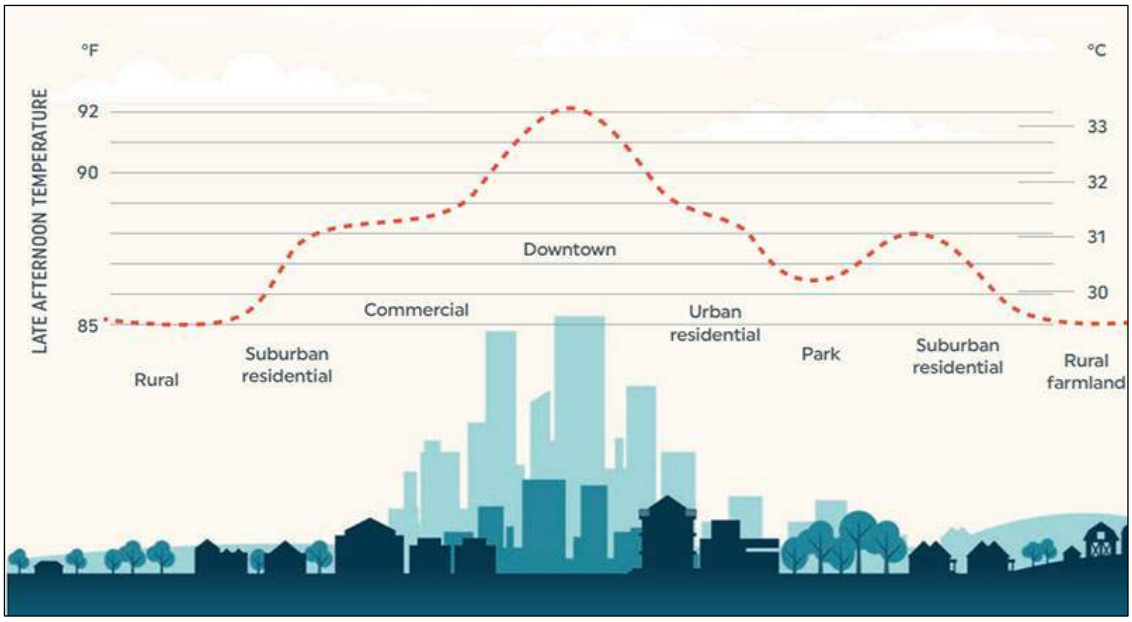




2.1.1.1 Heat Islands and Tree Cover

An urban heat island (UHI) occurs when an urbanized (largely impervious) area experiences much warmer temperatures than outlying areas. Impervious structures such as buildings, roads, and other infrastructure absorb and re-emit the sun's heat more than natural, vegetated landscapes and water bodies. Urban areas, where impervious structures are highly concentrated and vegetation is limited, become "islands" of higher temperatures relative to outlying areas. **Figure 2-3** presents a typical urban heat island profile.

Figure 2-3: Urban Heat Island Profile (Urban Land Institute, 2020)



Agawam's residential and commercial centers in town are largely impervious and lack tree cover and other vegetation, which makes them more vulnerable to UHI effect as a result of rising temperatures caused by climate change. In addition, climate change has been shown to impact the health of urban trees due to an increasing population of invasive insects, such as the emerald ash borer and the hemlock woolly adelgid. As well as reducing greenhouse gases (GHG), which helps slow climate change, vegetation helps slow and reduce runoff in urban areas through interception and uptake.

In 2020, PVPC prepared a preliminary study for the Town that investigated the existing urban canopy across the Town's neighborhoods using aerial imagery and provides an economic valuation of the air quality, stormwater management, and carbon sequestration and storage benefits that canopy provides. The study found canopy cover varies significantly across town and that more disadvantaged neighborhoods with higher rates of poverty and more minority residents tend to have less canopy cover. To combat the impact of UHI, the Town is considering increasing its tree canopy and identifying locations where impervious areas can be mitigated by removing it through redevelopment projects. Prioritizing impervious areas for increased canopy cover by adding trees and vegetation will yield the largest economic and environmental benefits for the Town.

2.1.1.2 Precipitation and Frequency Impacts

National Oceanic and Atmospheric Administration Atlas 14+ (NOAA14+) is the preferred method that MassDEP intends to adopt to determine rainfall intensity because it incorporates more risk and better accounts for larger observed storms. NOAA14+ is calculated by multiplying the Upper Confidence limit of the NOAA14 precipitation frequency estimates by 0.90. Differences in rainfall frequency and intensity between the NOAA14+ and TP40 data are shown for Agawam in **Table 2-1** below. The NOAA14+ rainfall intensity is greater than that of TP40 by approximately 27%, 42%, 48% and 59% for a 10-year, 25-year, 50-year, and 100-year event, respectively.

Table 2-1: Precipitation Data – TP40 vs. NOAA14+

Rainfall Event (return period, present day)[1]	TP40	NOAA14+	NOAA14+ Minus TP40	
	inches	inches	inches	%
10-year	4.5	5.73	1.23	27
25-year	5.3	7.55	2.25	42
50-year	6.0	8.86	2.86	48
100-year	6.7	10.62	3.92	59

[1] 24-hour storm duration

Part of this difference can be attributed to extreme precipitation events becoming more frequent, a trend that is expected to continue. For example, a storm that was previously considered a 100-year event when TP40 was published 1961 is now equivalent to an event with less than a 25-year frequency. Values for precipitation from the NOAA14+ estimates in **Table 2-1** do not account for expected changes to precipitation intensity and frequency due to climate change projections. Therefore, the NOAA14+ estimates presented in **Table 2-2** were adjusted using the Draft Tiered Methodology for Extreme Precipitation Depth and Intensity (Tier 2), which was developed by the Resilient MA Action Team (RMAT) and is described in Section 3 of their "Draft Climate Resilience Design Standards & Guidelines", developed in 2020.

Table 2-2: Precipitation Data – NOAA14+ Adjusted for Climate Change

Rainfall Event (return period, present day)	NOAA14+ Baseline (inches)	30-year Planning Period (2050)		50-year Planning Period (2070)	
		% increase[1]	inches	% increase[1]	inches
10-year	5.73	13%	6.47	22%	6.99
25-year	7.55		8.53		9.21
100-year	10.62		12.00		12.96

[1] Percent increase applied to NOAA14+ baseline values for each 24-hr design storm depth in accordance with RMAT Tier 2 Methodology: 13% for Mid-Century Planning Horizon (2030, 2050) and 22% for Late-Century Planning Horizon (2070, 2100).

Extreme precipitation, as rainfall, tends to occur in New England from spring through fall. When considering recent large (in size if not traditional class rating) hurricanes and the general warming trends in the ocean and atmosphere in New England, which will tend to produce heavier precipitation in general and lead to more rainfall constituting a greater portion of precipitation during winter storms, the potential for a nor'easter or hurricane to produce extreme rainfall should not be ignored. It will be prudent to continue to consider flood risk from extreme precipitation to properly understand risk and how individual protection components, like collection systems, culverts, pump stations, and berms/levees must be designed to provide complementary protection.

2.1.2 *Impacts of River Backwater*

Agawam is situated adjacent to the Connecticut River and the Westfield River along its eastern and northern borders, respectively. Riverine flooding occurs when a river overflows its banks and water spills out onto the floodplain, typically caused by heavy rain, and exacerbated in combination with snowmelt or river ice jams. Rising water surface elevations in the rivers receiving the Town's drainage can also reduce the capacity of outfall pipes' ability to discharge, as they become inundated and thus cause drainage problems farther upstream. Finally, rising water levels in rivers and streams can create a rise in groundwater tables that can create or exacerbate flooding in low-lying areas. Low-lying areas of Agawam and stormwater infrastructure adjacent to riverways could be especially vulnerable to flooding from river backwater. Drainage infrastructure located in low-lying areas of Agawam should be designed with impacts from rising water surface elevations and groundwater tables in mind.

2.1.3 *Environmental Justice Impacts*

Environmental Justice (EJ) neighborhood populations are defined by the Massachusetts EOEEA as a block group whose annual median household income is equal to or less than 65% of the statewide median ($62,072 in 2010), 25% or more of the residents identify as a race other than white, or 25% or more of household have no one over the age of fourteen who speaks English only or very well. EJ populations are more likely to live in risk-prone areas with poor or insufficient infrastructure and are more likely to seek emergency services during severe weather events. To non-English speaking EJ populations, there is also a lack of education and communication around the risks and impacts of climate change amongst the student population.

2.1.4 *Impacts on Infrastructure Priority*

Woodard & Curran used FEMA floodplain information, EJ areas, and existing drainage problem areas to help determine priority projects and projects highlighted in the CIP. Infrastructure project at these locations could be leveraged to introduce multi-benefit projects to enhance the Town's open spaces, tree cover, and to address water quality and EJ concerns. Projects in these areas serve populations more vulnerable to climate change effects, and the Town should also use this information when determining projects for implementation.

2.2 Infrastructure at Risk

Agawam owns and maintains several types of stormwater infrastructure including catch basins, culverts, detention basins, drainage manholes, and storm drainpipes. Underperformance of these systems, due to climate change, will have accompanying effects on other infrastructure within the Town, including the Town's water supplies, wastewater collection system, pump stations, roadways and bridges, and general access to critical routes or facilities. Increased precipitation also creates concern about changing chemical reactions in water and wastewater treatment and increasing pressure on aging reservoirs, among other issues.

The following sections of the Master Plan detail assessment efforts for the Town's culverts, storm drainpipes, detention basins, and an analysis of impervious area mitigation strategies in Agawam. In addition to the assessments noted above, Agawam's municipally owned outfalls were assessed as part of MS4 compliance efforts in 2020 and damaged outfalls were considered when developing the list of potential CIP projects.

The condition of certain stormwater infrastructure has implications on the Town's ability to combat climate change effects. Damaged outfalls and culverts can cause blockages that reduce system capacity. It will be critical to the performance of the Town's drainage system to repair this damaged infrastructure.

Additionally, eleven (11) known dams are in Agawam according to the Massachusetts Department of Conservation and Recreation's (DCR) Office of Dam Safety (ODS). These dams can be impaired during extreme weather events, which can result in potential damages to flood protection structures or cause streambank erosion that can expose critical infrastructure running along the banks of rivers and streams.

3. TOWN-IDENTIFIED CAPITAL PROJECTS

Prior to receiving the MVP Action Grant, the Town had identified sixteen (16) capital projects that they are hoping to plan, design, and construct solutions for over the next 5 to 10 years. The capital projects were identified by the Town's Department of Public Works (DPW), Engineering Department staff, and by residents via the Town's interactive GIS Application for reporting issues related to the storm drain network, which is further described in **Section 5.1** of this Plan.

A description of each of the sixteen (16) Town-identified capital projects and their current project status are described in the sections below. CIP sheets for each of these projects are included in **Appendix G.**

3.1 Ongoing Projects

The following four (4) Town-identified projects have recently been advanced by the Town to preliminary planning or conceptual design phases, via investigations conducted as part of this Master Plan development effort or separate efforts.

3.1.1 *North Westfield Street – May Hollow Brook Culvert (CLV-14)*

The May Hollow Brook culvert, identified by the Town as CLV-14, is a concrete box culvert located under North Westfield Street. A site visit by the Agawam Conservation Commission and DPW in the fall of 2019 identified severe deterioration of the western (upstream) portion of the culvert, which prompted the temporary closure of the eastbound lane of North Westfield Street until a temporary structural repair could be performed. MassDOT supported the Town's efforts by evaluating the culvert, designing temporary structural repairs, and constructing the temporary repairs in late 2019. These repairs were expected to be in place for no more than three (3) years (2022).

As part of this Master Plan, the May Hollow Brook culvert was visually assessed and found to be in very poor condition. The assessment is described in more detail in **Section 4** of this plan. Following this assessment, replacement of this culvert with a large box culvert or bridge, sized to convey at least the 50-year storm event, is recommended. In March 2021, the Town of Agawam submitted an application to the Massachusetts Department of Fish and Game, Division of Ecological Restoration's (DER's) Culvert Replacement Municipal Assistance Grant Program, seeking funding assistance to complete the design and permitting of the May Hollow Brook culvert replacement project.

3.1.2 *North Street (White Brook) Culvert (CLV-41)*

The North Street culvert, identified by the Town as CLV-41 and sometimes referred to as the Deep Gutter culvert, is a corrugated metal pipe (CMP) culvert, that conveys flow from White Brook underneath North Street, adjacent to the Town's sewer pump station. Several pipe sections from the downstream end of the culvert have deteriorated and appear to have broken off, creating a partially perched outlet which restricts wildlife passage and contributes to erosion within the stream. Streambank erosion is present both up and downstream of the culvert. Erosion upstream of the culvert is partially attributed to a high intensity storm event in February 2018, which resulted in the collapse of the culvert's upstream embankment. A temporary repair was completed by the Town by installing riprap to stabilize the embankment.



Photo 3-1: Temporary repairs at the North Street Culvert

As part of this Master Plan, the North Street culvert was assessed and found to be in poor condition. The assessment is described in more detail in **Section 4** of this plan. The Town received a DER Culvert Replacement Municipal Assistance Grant to fund the data collection and preliminary evaluation of the culvert. The work conducted under this grant included conducting survey, wetland delineation, and geotechnical borings as well as developing an alternatives analysis which included preliminary hydrologic and hydraulic models for each alternative. Following the completion of this work, the Town can select a preferred alternative and proceed to final design and permitting.

3.1.3 *Meadow Street/Regency Park Drive*

In recent years, Agawam residents have been reporting severe flooding during storm events on Meadow Street, near the Regency Condominiums on Regency Park Drive and Joseph Street. During certain storm events, the flooding has made Meadow Street and Regency Park Drive impassible. There are several catch basins within the drainage network, however, uneven pavement surfaces on Meadow Street make it difficult for stormwater to flow to them. In 2017, the DPW conducted a closed-circuit television (CCTV) inspection of the drainage system in this area, and it was discovered that the cross-country storm drainpipe running parallel to the Regency Condominium property line was heavily impacted with debris and tree roots. The DPW flushed the pipe, which seemed to temporarily help the flooding situation. In 2019, a CCTV investigation of the Meadow Street drainage network closer to James Avenue and Kirkland Street found that many of the storm drainpipes had fractures or breaks.

In May 2021, the Town began the design of drainage improvements seeking to address historic flooding along Meadow Street and surrounding the Regency Condominiums located at Regency Park Drive. The Town is hoping to construct these drainage improvements during the 2022 construction season.

3.1.4 *Belvidere Avenue/Brookline Avenue*

In recent years, Agawam residents have been reporting flooding during storm events on Belvidere Avenue, Brookline Avenue, and residential driveways off both streets. Topographically, both streets appear to be relatively flat, which can restrict or delay stormwater runoff from reaching catch basins during heavy storm events.

As part of this Master Plan, the Belvidere Avenue and Brookline Avenue drainage network was assessed via CCTV investigations, which is described in more detail in **Section 5** of this Plan. Following the CCTV investigation of this area, a drainage study, stormwater infrastructure upgrades, and roadway regrading and resurfacing seeking to address historic flooding on both roadways are recommended for the drainage network.

3.2 Potential Future Project Areas

The following twelve (12) project areas have known drainage issues and are in various stages of the preliminary planning process. These areas were not investigated during the development of this Master Plan, as the next steps for planning or conceptual design phases have already been identified by the Town.

3.2.1 *South Park Terrace*

Residents living on South Park Terrace have reported street and yard flooding during large storm events in recent years. The drainage network on South Park Terrace mostly consists of several dry wells, which are not typically designed with the capacity to store stormwater volumes from high-intensity storm events. In addition, the soils in the area surrounding the South Park Terrace are not ideal for infiltrating stormwater, which is likely increasing the volumes of stormwater flooding the street and residents' properties.

The Town considered installing a stormwater conveyance system on South Park Terrace consisting of storm drainpipes, catch basins, and manholes. However, the improvements were not progressed as the MassDOT did not

approve the proposed storm drain interconnection on Main Street. In addition, the proposed drainage improvements would have been costly, as South Park Terrace sits at a lower elevation than Main Street and the project would have required the construction of a stormwater pump station to convey stormwater to an adequate tie-in elevation.

Prior to this Master Plan, a topographic survey and drainage study of the South Park Terrace and surrounding area were conducted. Based on the results of this investigation, a consultant recommended that the Town install a stormwater conveyance system on South Park Terrace that discharges to the existing drainage network on Raymond Circle. Once the project enters the design phase, calculations will be required to determine whether the Raymond Circle drainage network will need to be upgraded to accommodate additional stormwater volumes from South Park Terrace.

3.2.2 *Fairview Street/Federal Street Extension*

In recent years, Agawam residents have been reporting flooding during large storm events on Fairview Street, the Federal Street Extension, and residential driveways off both streets. Previous CCTV investigations of the drainage system in this area have shown that the pipes are impacted by tree roots and may be too damaged to repair via heavy cleaning efforts. Recommended next steps for this project include additional CCTV of the drainage network on Fairview Street and the Federal Street Extension, a drainage study, and stormwater infrastructure replacement and upgrades, seeking to address historic flooding on both roadways.

3.2.3 *Ramah Circle*

Residents and businesses along Ramah Circle have reported flooding along the road and within their properties. This occurs mostly along Ramah Circle North, and it appears that the drainage system is undersized, resulting in surcharging of catch basins and manholes during certain storm events. Flooding has impacted at least one business, at #70 Ramah Circle North, with water in the parking lot and garage bay entrances to the building. The drainage system, which collects runoff from the northwest of Ramah Circle and developed properties along Springfield Street between Rowley Street and Columbus Street, appears to be a significant contributor to the stormwater flows. There is a stormwater discharge from Rowley Street that may also be contributing to flows entering Ramah Circle. Recommended next steps for this project include conducting CCTV investigations of the drainage network on Ramah Circle, a drainage study, and possible stormwater infrastructure replacement and upgrades, to address the historic flooding on the roadway.

3.2.4 *Liberty Street*

Residents living on Liberty Street have reported street flooding on the northern portion of the street during large storm events. The drainage system on Liberty Street consists entirely of dry wells, with four located north of Carmen Avenue and two located at #81 and #82 Liberty Street. Recommended next steps for this project include a drainage study of the Liberty Street area and, depending on the results of the drainage study, possibly constructing a stormwater conveyance system on Liberty Street.

3.2.5 *Hall Street*

Residents living on Hall Street have reported street flooding during large storm events. All drainage on Hall Street appears to be country runoff; there are no known storm drainpipes or structures in the roadway. Recommended next steps for this project include a drainage study of the Hall Street area and, depending on the results of the drainage study, possibly constructing a stormwater conveyance system on Hall Street.

3.2.6 *Ellison Avenue*

Residents living on Ellison Avenue have reported street flooding on the southern portion of the street, particularly during the winter. Flooding during winter months may be a result of plowing, causing a buildup of snow and debris along the sides of the roadway that prevents stormwater runoff from flowing off the street. All drainage on Ellison Avenue appears to be country runoff as there are no known storm drainpipes or structures in the roadway. Recommended next steps for this project include a drainage study of the Ellison Avenue area and, depending on the results of the drainage study, possibly constructing a stormwater conveyance system on Ellison Avenue, or developing a snow plowing plan for the roadway that maintains locations for stormwater runoff to flow off of the roadway.

3.2.7 *James Street/Maynard Street*

Residents living on James Street and on Maynard Street, between James Street and Carmen Avenue have reported street flooding during large storm events. All drainage on James Street and this portion of Maynard Street appears to be country runoff; there are no known storm drainpipes or structures in these sections of roadway. Topographically, both streets appear to be relatively flat, which can cause stormwater to pond on the roadway during storm events and can contribute to the deteriorating pavement conditions on both roadways. Recommended next steps for this project include a drainage study of the James Street and Maynard Street areas and, depending on the results of the drainage study, possibly constructing stormwater conveyance systems on both streets.

3.2.8 *#4 Hunters Greene Circle*

There is a swale located along the western side of the property at #4 Hunters Greene Circle that is designed to convey stormwater to the north, to a stream that is a tributary of the Fourmile Brook. The owner of this property has reported flooding in the swale during large storm events. Initial site investigations indicated that debris had built up in the swale over time. Recommended next steps include removing any debris from within the swale that may be restricting flow and conducting a drainage study to determine whether the swale is adequately sized to convey stormwater runoff from Hunters Green Circle to the stream.

3.2.9 *#59 Rowley Street*

Erosion of the embankment surrounding the concrete headwall of a storm drain outfall, identified by the Town as WB-36-325, has caused the entire headwall structure and connected 18-inch CMP to slide down the slope of the embankment. The displaced concrete headwall and outfall pipe will need to be replaced, and the eroded embankment surrounding outfall WB-36-325 will need to be repaired and stabilized.

3.2.10 *#43 Westford Circle*

Segments of the reinforced concrete outfall pipe located on the western portion of the property at #43 Westford Circle, and identified by the Town as TM-41-738, have been disconnecting as a result of soil eroding beneath the pipe. The outfall pipe will need to be replaced and the eroded embankment surrounding the outfall will need to be repaired and stabilized.

3.2.11 *Parkedge Drive*

The drainage system in the southern portion of Parkedge Drive discharges into a stream via an outfall pipe located between #87 and #95 Parkedge Drive, which is identified by the Town as MAY-11-483. Site investigations have indicated that erosion caused by heavy storm events has widened the stream bank, such that the top of slope is now encroaching onto private property and may pose a risk to the structural integrity of the foundations of nearby residential buildings. Recommended next steps for this project include extending the outfall pipe approximately 20 feet to the

southeast and installing structural fill to build out the top of the stream bank slope. Riprap slope stabilization and a new splash pad at the relocated outfall invert will need to be installed.

3.2.12 *Walnut Street Extension*

Walnut Street Extension, between North Ramah Circle and Springfield Street, is relatively flat with poor drainage and a lot of connected impervious surfaces from abutting commercial properties. While the area does not experience significant flooding, future streetscape and utility improvements will support several opportunities to improve stormwater conditions and water quality. This includes removing and disconnecting impervious surfaces, deep sump catch basins, incorporating vegetated swales and bioretention areas along roads and walkways, and increasing increased tree canopy to reduce heat island effect. The redevelopment of the street corridor will improve parking and access for pedestrians and bikers, as well as provide outdoor seating adjacent to businesses. A streetscape improvement conceptual design was developed in 2016 but was not funded for design and construction. The conceptual design needs to be updated due to nearby road and traffic condition changes, and the revised conceptual design should include many of the above referenced stormwater improvements. Additionally, this streetscape redevelopment project should include highly visible stormwater improvements to highlight how aesthetically pleasing stormwater practices can be incorporated into the urban landscape, such as curb inlets to pocket bioretention cells that overflow back to a catch basin.

4. CULVERT CONDITION ASSESSMENT

The Town maintains municipally owned culverts, or structures that convey a stream or open drain under a road, trail, driveway, or railroad. Woodard & Curran assessed Town owned culverts, identified culvert crossings in danger of failure, and incorporated this information into the Town's Master Plan and potential CIP projects. The culvert condition assessment aims to enhance the Town's ability to identify and develop recommendations to repair or replace deteriorating culverts through risk analysis and prioritization.

4.1 Data Review & Field Assessment

4.1.1 *Desktop Analysis*

Prior to conducting field work, Woodard & Curran reviewed available GIS data provided by the Town and identified 235 municipally-, state-, and privately-owned assets to be assessed. The field assessment excluded several potential assets including known bridges, defined by the MassDOT as a structure having a span of greater than ten (10) feet, culvert crossings underneath state owned roads, and most culverts located on private property. Of the 235 identified assets, Woodard & Curran was able to exclude three (3) state owned culverts and fifty-seven (57) privately owned culverts, resulting in a total of 170 municipal and five (5) private culverts to be assessed as part of this exercise as shown in **Table 4-1**, below:

Table 4-1: Desktop Analysis Results

Analysis	Municipal	Private	State	Total
Total Assets Identified	170	62	3	235
Total Assets Excluded	0	57	3	60
Total Assets Assessed	170	5	0	175

4.1.2 *Fieldwork & Methodology*

4.1.2.1 Field Assessment Tools

Prior to conducting field work, Woodard & Curran developed a web-based application using ArcGIS Collector (Collector Application) and ArcGIS Survey123 (Survey123), both Esri applications. These applications were used to record information including culvert type, material, size, condition, specific observations, and presence and condition of headwalls for each asset. The applications allowed photos of each asset to be attached to the assessment record. The Collector Application geographically stores asset information, allowing the user to locate each asset in the field. Once an asset is located, the assessor uses the Collector Application to add an assessment through Survey123. An example Survey123 assessment form is provided in **Appendix B** of this report.



Photo 4-1: CLV-30 – Zoom camera video snapshot showing hole in wall of culvert.

Woodard & Curran utilized pole mounted zoom camera technologies to supplement visual observations of the culverts. The zoom camera provided a detailed view of the structural features of the culverts without having to enter the pipe. The zoom camera produces a high-quality video recording of the assessment and can be used to assess the condition of an entire culvert even when the pipe is partially submerged, unlike traditional CCTV equipment. With the zoom camera, Woodard & Curran was able to identify defects such as cracking or poor joint conditions deep into the culvert barrel that could have otherwise gone unnoticed. In addition, the zoom camera was used to identify any utility connections, such as drain lines, into the crossing to help understand the drainage system connecting an asset.

4.1.2.2 Field Assessment

Woodard & Curran observed each culvert to determine its condition and corresponding likelihood of failure (LoF) score. Woodard & Curran visually assessed structural components of the crossing, specifically noting the following: conduit deterioration and/or cracking, cross section deformation, joint and seam conditions, and headwall conditions, if applicable. In addition to assessing structural components, Woodard & Curran noted if the culvert was submerged or filled with sediment, the presence of thick vegetation or excess leaf litter, and the presence of erosion to the banks, headwalls, or embankments among several other non-structural elements. While these elements may not directly relate to the overall condition of the culvert, these elements are important for planning future operations and maintenance (O&M) work in Town. The visual structural assessment, supplemented by the zoom camera video and other non-structural elements surrounding the culvert, resulted in a culvert condition score ranging from very good to very poor.



Photo 4-2: CLV-27 – Example of culvert in good condition.

The Town's culverts were assessed by Woodard & Curran between November 16 and 19, 2020. During the assessment, five (5) additional municipally owned culverts, that were not identified in the desktop analysis, were located, identified, and assessed in the field. As a result, the total number of municipal (175), state (3), and privately (62) owned culverts increased from 235 to 240.



Photo 4-3: CLV-158 – Example of culvert in poor condition.

In cases where culvert crossings had more than one conduit, each conduit was considered a separate asset for the purpose of this assessment. Woodard & Curran identified eleven (11) municipally-owned culverts that were not mapped as separate assets increasing the total number of municipal (186), state (3), and privately (62) owned assets in the Town from 240 to 251. These eleven (11) culverts were named by adding "B" to the end of their Town assigned culvert ID. Separate zoom camera videos and assessments were completed for each of these eleven (11) culverts. The total number of culvert assets are presented in **Table 4-2**.

Table 4-2: Total Culvert Assets Identified

Culvert Identification Type	Municipal	Private	State	Total
Total Assets Identified During Desktop Analysis	170	62	3	235
Total Assets Identified in the Field	5	0	0	5
Total Assets with Multiple Unmapped Culverts	11	0	0	11
Total Assets Town Wide	**186**	**62**	**3**	**251**

Of the 186 municipally-owned culverts, four (4) were reclassified as bridges, ten (10) were reclassified as field inlets, and four (4) were reclassified as outfalls in the field. Woodard & Curran could not access seven (7) culverts due to vegetation overgrowth, private fencing, or construction activities, fourteen (14) of the culverts could not be located in the field, and four (4) culverts were completely submerged. In total, forty-three (43) assets identified as culverts during the desktop analysis were not assessed. Further investigation is recommended for each of the twenty-five (25) culverts that were not reclassified as non-culverts in the field and were not assessed to determine a LoF for these culverts. The culverts not assessed are listed in **Table 4-3**, below:

Table 4-3: Summary of Culverts Not Assessed

Rationale	Culvert ID					
Could Not Access (7)	CLV-114	CLV-170	CLV-178	CLV-232	CLV-242	CLV-251
	CLV-252					
Could Not Locate (14)	CLV-46	CLV-47	CLV-48	CLV-86	CLV-92	CLV-102
	CLV-104	CLV-117	CLV-121	CLV-123	CLV-124	CLV-171
	CLV-200	CLV-254				
Reclassified as Bridge (4)	CLV-83	CLV-114	CLV-149	CLV-247		
Reclassified as Field Inlet (10)	CLV-1	CLV-10	CLV-18	CLV-24	CLV-87	CLV-93
	CLV-94	CLV-162	CLV-179	CLV-174		
Reclassified as Outfall (4)	CLV-19	CLV-22	CLV-31	CLV-159		
Submerged (4)	CLV-65	CLV-66	CLV-79	CLV-304		

A summary of the total assets visited in the field is provided in **Table 4-4,** below:

Table 4-4: Summary of Assets Assessment

Culvert Status	Municipal	Private	State	Total	Percentage
Assessed	143	5	0	148	59%
Not Assessed	43	57	3	103	41%
Total	186	62	3	251	100%

4.2 Risk Analysis Methodology

A critical component of maintaining effective infrastructure in a cost-effective manner is to utilize available data to make informed decisions, largely driven by "risk". For this assessment, risk is defined as the probability or likelihood of culvert crossing failure and the consequences of that failure. Risk is a metric that illustrates how critical an asset is to the

system as a whole. A risk assessment considers each asset's LoF and consequence of failure (CoF), and is defined as the product of these two factors as shown in the equation below:

$$Risk = LoF\ x\ CoF$$

This risk analysis will serve as a guide for the Town to inform their CIP, developed as part of this Master Plan, and maintenance programs to provide the appropriate level of service to their residents in a cost-effective manner.

4.2.1 *Likelihood of Failure*

The LoF of an asset is a measure of the condition, performance, and reliability of each asset and attempts to identify the potential of failure. Through a condition assessment, an asset's condition, performance, and reliability is rated on a scale of 1 to 5, indicating that an asset will fail to perform as required, with 1 having the lowest likelihood of failure and 5 having the highest likelihood. LoF parameters are generally scored using the guidelines in **Table 4-5**, below:

Table 4-5: Likelihood of Failure Scoring Guidelines

1 (Very Low)	2 (Low)	3 (Moderate)	4 (High)	5 (Very High)
Fully functional as design, < ¼ life expended.	Fully functional for current operating conditions, ¼ - ¾ life expended.	Functions as needed for current operating conditions, > ¾ life expended.	Operable, but does not function as needed for current operating conditions.	Not functional – requires major repair, rebuild, or replacement to operate properly.

LoF scores can change over time as assets degrade and conditions change. For example, the LoF of a culvert may increase as the asset ages and becomes more deteriorated over time. Accurate calculation of LoF, determination of risk, and prioritization of culvert replacement or repair projects depend on up-to-date condition information at each asset.

4.2.2 *Consequence of Failure*

The CoF of a culvert is dependent upon the asset's function, role, and location within the drainage system and is not subject to change based on asset condition. Specific and quantifiable asset metrics must be defined to determine the CoF score of an asset. The following bullets provide a brief description of each CoF metric, as well as the methodologies followed to extract the data necessary to assign CoF values.

- **Street Classification:** This category accounts for the impacts of an asset failure on traffic flow and safety of roadways. For example, a sinkhole caused by a culvert failure under a major arterial road would affect more people and businesses than a sinkhole on a minor residential street. Streets identified as dead ends are considered to have a moderate CoF score because the impacts of failure could impact a resident's ability to receive help from emergency services. Assets located on access roads, trails, or in the woods were assigned a very low CoF for the street classification metric. The Town's streets have been assigned different classifications based on MassDOT Federal Functional Class GIS data layers. Assets were assigned a CoF rating based on the street classification where they are located. Woodard & Curran confirmed each culvert's classification via a visual and GIS review of dead ends, access roads, or trail/woods.

- **Pipe Diameter:** This category accounts for the effect of pipe diameter on the potential CoF. For example, failure of larger culverts would be more disruptive due to the larger flows typically carried by the large pipe diameters. Large pipes are also comparatively more expensive to replace or repair. Assets were assigned a CoF rating based on the pipe diameter size which was measured in the field as part of the culvert assessment.

- **Pipe Depth:** This category accounts for the accessibility of a culvert. Generally, deeper crossings are more expensive and more impactful to the surrounding environment to repair or replace. Approximate pipe depths, from the ground surface to the top of the culvert, were measured in the field as part of the culvert assessment.

A numerical rating of 1 to 5 is assigned to each of the asset's CoF parameters, which indicates the magnitude of impacts resulting from the failure to perform as required, with 1 having the lowest consequence and 5 having the highest consequence. **Table 4-6**, below, summarizes the CoF categories and provides a basis for the scoring system of the Town's culverts.

Table 4-6: Culvert Asset CoF Rating Matrix

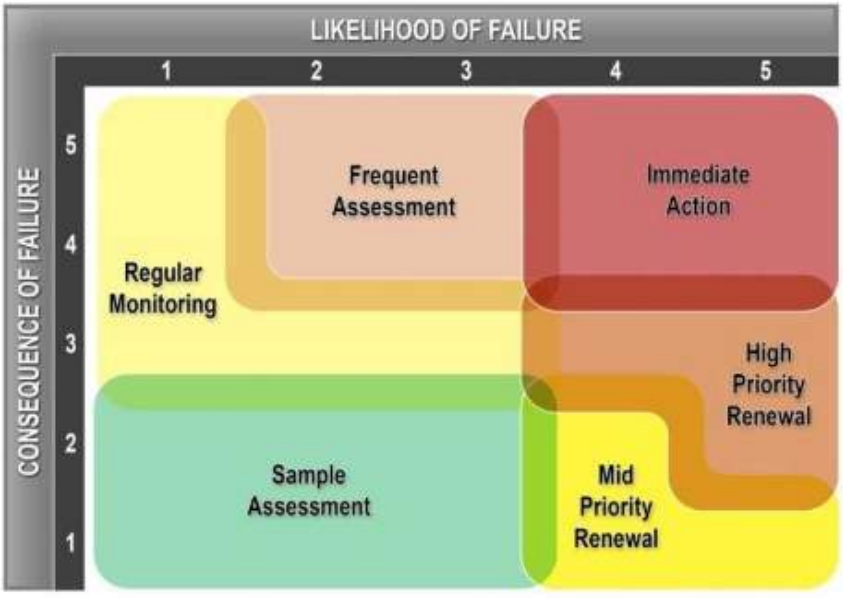
CoF Parameter	CoF Scoring				
	5.00-4.01 (Very High)	4.00-3.01 (High)	3.00-2.01 (Moderate)	2.00-1.01 (Low)	1.00-0.00 (Very Low)
Street Classification Rank	Major Arterial	Minor Arterial	Major Collector or Dead End	Minor Collector	Local Roads, Access Roads, Woods
Pipe Diameter[1]	Dia. ≥ 48"	36" < Dia. ≤ 48"	24" < Dia. ≤ 36"	12" < Dia. ≤ 24"	Dia. ≤ 12"
Pipe Depth	≥ 8' below road	6' < road ≤ 8'	4' < road ≤ 6'	2' < road ≤ 4'	≤ 2' below road

Note: 1. Pipe diameter for a box culvert was classified based on a comparable circular pipe calculated by the cross-sectional flow area.

4.2.3 *Risk Interpretation and Action Levels*

A Risk Matrix is a graphical representation of the risk scores which can be used to identify the appropriate attention to be paid to an asset. The Risk Matrix typically shows all the assets in the analysis with the LoF on the X-axis and the CoF on the Y-axis, as shown in **Figure 4-1**, below. An asset's location on the matrix provides information about how to manage the asset, also referred to as the asset's Action Level.

Figure 4-1: Risk Matrix – Asset Action Level



For the purpose of the Town's CIP, assets can fall into one (1) of six (6) Action Level categories that describe the recommended monitoring frequency or renewal priority for an asset, depending on the product, or combination of CoF and LoF. For example, assets with low LoF require different levels of monitoring based on their CoF, while those with higher LoF are recommended for renewal. The CoF determines the frequency for monitoring or the priority of renewal. Assets with a low CoF are only monitored occasionally and may even be "run to failure" without high risk, while assets with high CoF may require frequent assessment so they can be replaced at the first signs of trouble. These Action Levels are approximate based on a high-level assessment of the asset. Some assets fall on the boundaries between different Action Levels and may require further investigation or professional judgement to determine the proper maintenance and renewal activities.

The culverts ranked on the right side of the risk matrix action level chart have a Mid-Priority, High Priority, and Immediate Action considerations for replacement projects. The culverts ranked on the left side of the chart have Frequent Assessment, Regular Monitoring, and Sample Assessment incorporated into planned maintenance activities. These action levels are described below in order of highest priority to lowest:

- **Immediate Action:** Assets with the highest CoF and LoF values are considered highly critical to the system and likely to fail in the near future. These assets should be given individual attention to determine a schedule for expedited renewal or replacement.

- **High-Priority Renewal:** Assets with high CoF and LoF values are considered a high priority for renewal or replacement. They have been identified in poor condition as well as providing a critical function within the system. Therefore, these assets should be included on a near-term CIP for renewal or replacement.

- **Mid-Priority Renewal:** Assets with high LoF but low CoF are considered to be the lowest priority for renewal or replacement based on their criticality to the system. These assets have been identified in poor condition, but their criticality to the system is lower and, therefore, replacement is not an immediate need but should be considered based on available budget.

- **Frequent Assessment:** Assets with a high CoF are critical to the operation of the system and are the highest priority for maintenance in order to ensure they remain operational. As these assets' LoF scores increases, they become high-risk assets, which require immediate action outside of regular maintenance activities. Frequent assessment may consist of performing condition assessments every three to five years in order to closely monitor any changes in the asset's LoF.

- **Regular Monitoring:** Assets requiring regular monitoring have a higher CoF and lower LoF, such that they are prioritized for observation and maintenance to ensure they remain operational. The high CoF indicated that they are critical to the operation of the system but not as critical as some other assets. Regular monitoring may consist of performing condition assessments on the asset every ten years.

- **Sample Assessment:** Assets with a low CoF and LoF are considered the lowest priority for maintenance activities and planning. The most cost-effective method of maintaining these kinds of assets is to periodically observe and track the condition as a group, relying on sample data to gauge the overall condition of other assets. The failure of these assets would generally have a very low impact. Sample assessment may consist of performing condition assessments on a small sample set of these assets every 20-25 years.

4.3 Field Assessment Results

4.3.1 *Likelihood of Failure Results*

For the LoF analysis, the condition observed during the field assessment, confirmed by review of zoom camera videos, was used to determine a LoF rank for each asset. **Table 4-7**, below, summarizes the condition of the Town's assessed culverts.

Table 4-7: Summary of LoF Results

Likelihood of Failure (Score)	Very High (5)	High (4)	Moderate (3)	Low (2)	Very Low (1)	Total
Quantity	14	47	53	32	2	148
Percentage	9%	32%	36%	22%	1%	100%

As shown in **Table 4-7**, most culverts were identified to have a moderate LoF, meaning the culvert was observed to be in fair condition. Of the 148 culverts assessed, 61, have a high or very high LoF, meaning the culvert was observed to be in either poor or very poor condition. On average, the overall condition for the Town's culverts is 3.26, falling in between a high and moderate LoF. A summary table showing the LoF scores for each culvert, a summary of comments and observations for each culvert, and a map depicting the LoF at each culvert is provided in **Appendix B**.

4.3.2 *Consequence of Failure Results*

For the CoF analysis, the ratings from the three CoF parameters, described in **Table 4-6**, were averaged together to obtain a single composite CoF rank for each asset. A summary of the CoF Analysis Results is provided in **Table 4-8** below.

Table 4-8: Summary of CoF Results

Consequence of Failure (Score Range)	Very High (5.00-4.01)	High (4.00-3.01)	Moderate (3.00-2.01)	Low (2.00-1.01)	Very Low (1.00-0.00)	Total
Quantity	8	26	67	44	3	148
Percentage	5%	18%	45%	30%	2%	100%

As shown in **Table 4-8**, most culverts were identified to have a moderate CoF with scores ranging between 3.00 – 2.01. Culverts identified as having a low or very low CoF make up 32% of all culverts assessed, though 23% of all culverts have a high or very high CoF. On average, the overall CoF score for the Town's culverts is 2.60, falling into the moderate CoF category. A summary table showing the CoF scores for each culvert and a map depicting the CoF at each culvert is provided in **Appendix B**.

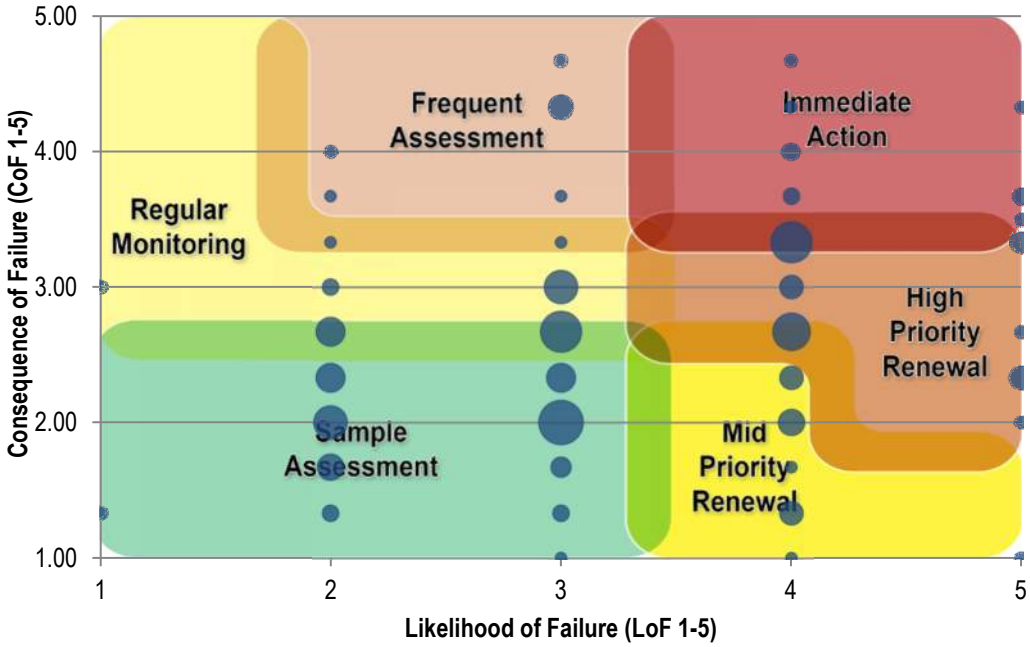
4.3.3 *Risk Action Level Results*

The results of the risk analysis are summarized in **Table 4-9**. The risk matrix depicting actions levels is shown in **Figure 4-2**.

Table 4-9: Culvert Assessment Action Level Results

Action Level	Count	Percentage
Immediate Action	22	15%
High Priority Renewal	23	16%
Mid Priority Renewal	16	11%
Frequent Assessment	10	7%
Regular Monitoring	29	20%
Sample Assessment	48	32%

Figure 4-2: Culvert Risk Matrix with Action Levels



As shown in **Table 4-9** and **Figure 4-2**, 52% of the Town's culverts fall into the "Sample Assessment" or "Regular Monitoring" action levels. Of the 148 culverts assessed, 22 municipally owned culverts fall into the "Immediate Action" action level and should be considered with the highest priority for replacement or repair. There are several culverts that have higher risk scores than the culverts in the "Immediate Action" action level, though due to a comparatively moderate LoF or CoF, they are assigned a lower action level and therefore priority. **Table 4-10,** below, summarizes the Culvert ID, culvert location, LoF score, CoF Score, Risk Score, and comments or observations that contributed to their LoF scores for the top 10 priority culverts in Town.

Table 4-10: Top 10 Priority Culverts

Priority	Culvert ID	Street Name(s)	LoF Score	CoF Score	Risk	Comments and Observations
1	CLV-14	N Westfield Street	5.00	4.33	21.67	Conduit deterioration and cracking observed.
2	CLV-9	Southwick St	4.00	4.67	18.67	Conduit deterioration observed; poor headwall condition; poor joint/seam condition; small box culvert adjacent to culvert.
3	CLV-30	North St	5.00	3.67	18.33	Conduit deterioration and cracking observed; conduit material changes; erosion observed downstream; outlet projecting; poor joint/seam condition; poor headwall condition; sediment/vegetation removal needed.
4	CLV-90	Suffield St	5.00	3.67	18.33	Conduit deterioration and cracking observed; poor headwall condition observed; conduit is 40% blocked with roots; conduit material changes; embankment erosion observed upstream.
5	CLV-85	Shoemaker Ln	5.00	3.50	17.50	Sediment/vegetation removal needed; outlet possibly collapsed, could not locate.
6	CLV-41	North St	4.00	4.33	17.33	Conduit deterioration and cracking observed; embankment and streambank erosion observed up and downstream; conduit bends; drainage system connects directly into the conduit.
7	CLV-8	Southwick St	4.00	4.00	16.00	Conduit deterioration and cracking observed; poor headwall condition.
8	CLV-37	Springfield St	4.00	4.00	16.00	Conduit deterioration observed; erosion along upstream headwall; drainage system ties directly into conduit.
9	CLV-29	North St	4.00	3.67	14.67	Conduit deterioration observed, two segments disconnected; poor headwall condition, collapse observed downstream; poor joint/seam condition; infiltration into conduit observed; conduit is misaligned and dips; sediment/vegetation removal needed.
10	CLV-148	Oak St	4.00	3.67	14.67	Conduit deterioration and cracking observed; outlet is projecting.

4.4 Recommendations

Woodard & Curran has calculated priority rankings based off the field assessment for each of the 148 culverts assessed in this plan based on their risk score and action level category. The Town may choose to implement a rotating assessment schedule for each municipal culvert to identify necessary O&M activities, including debris clearing to maintain the conveyance capacity of each culvert, and identify signs of culvert deterioration. In addition, the Town should consider inspecting the twenty-five (25) culverts that could not be assessed in the field, as described in **Section 4.1.2.2** of this Plan, and municipally owned crossings classified as bridges throughout the Town to identify crossings in need of replacement. A table summarizing these results, each culvert's prioritization and action level, and a map depicting the action level of each culvert is provided in **Appendix B**.

Woodard & Curran has included the top ten priority culvert replacement projects in the CIP, provided as **Appendix G** to this Plan. Woodard & Curran has assumed that the culverts identified and included in the CIP will be fully replaced because most culverts identified are likely undersized and/or the structural defects do not allow for trenchless rehabilitation through lining. Trenchless rehabilitation may be utilized to extend the useful life of select culverts. Capital improvement recommendations based on the findings of the culvert assessment are further described in **Section 8** of this Plan.

5. STORM DRAIN INFRASTRUCTURE ASSESSMENT

Storm drainpipes, manholes, and catch basins are designed to collect and convey stormwater from drainage catchments to downstream discharge points, also known as outfalls. The Town owns and operates approximately 120 miles of storm drainpipes, 2,400 manholes, 4,800 catch basins, and 355 outfalls. As part of the ongoing development of the Town's Master Plan and CIP, Woodard & Curran conducted a desktop analysis of available storm drain infrastructure data to prioritize areas for further investigation. Following this analysis, the Town engaged BMC Corp. (BMC) of Billerica, Massachusetts to perform CCTV inspections of approximately 20,200 linear feet (3.8 miles) of the Town's storm drainpipes in January 2021. The storm drain infrastructure assessment described herein was developed and implemented to assess the Town's existing infrastructure data, structural condition, and to locate defects causing operational issues within the Town's stormwater system.

5.1 Desktop Analysis

Woodard & Curran performed a desktop analysis of existing stormwater infrastructure data provided by the Town to identify information gaps and prioritize field observations. The desktop analysis included a review of the following information:

- **Geographic Information System (GIS) Storm Drain Data:** The Town's existing GIS data contains the locations of storm drain infrastructure and associated attribute data, including:
    - Infrastructure Ownership: Denotes which storm drainpipes are Town-owned, State-owned, or privately-owned. Only Town-owned pipes were considered and prioritized for further evaluation.
    - Pipe Size: In general, the storm drainpipes with the largest diameters are located at the downstream ends of stormwater catchments and convey the largest volumes of stormwater flow to outfalls. As a result, large-diameter storm drainpipes typically have the highest CoF.
    - Pipe Material and Age: Different pipe materials have different estimated useful life expectancies. For example, high-density polyethylene (HDPE) pipes typically have a longer useful life expectancy than corrugated metal pipes (CMPs). Reviewing the materials and installation dates of the Town's storm drainpipes, with regards to estimated useful life expectancies, provided insights into which pipe segments may be nearing the end of their useful life, and therefore which pipes may have a higher LoF.
    - Pipe Location: Pipes located beneath high-traffic roadways, underneath buildings, and/or near essential service buildings (schools, hospitals, etc.) have a high CoF.
- **GIS Data Gaps:** The Town's GIS data was reviewed to identify storm drain infrastructure information gaps, including unknown attribute data and areas where pipe connectivity information was not available. Performing CCTV in areas with identified data gaps is beneficial to supplement the Town's existing knowledge of their storm drain system.
- **Agawam Stormwater System – Information Reporting Map:** In 2017, the Town created an online GIS platform, accessible via the Town's website, for residents and visitors to report stormwater-related issues. Users of the platform can place a point on a map of the Town to report damage to the stormwater system, debris build-up, erosion, flooding, suspected illegal dumping, maintenance needs, and other concerns. Once the location of the incident is selected, users are prompted to input a description of the issue, their contact

information, and any pictures or videos related to the report, if desired. Reports on this platform through November 2020 were reviewed and considered when prioritizing storm drain locations for further evaluation.

- **Town-Identified Drainage Issues:** The Town maintains a working list of known drainage issues, including the location and a general description of the issue and possible solutions. Of the sixteen (16) drainage issues documented in the Town's file, twelve (12) are related to flooding, and four (4) are related to structural deterioration or damage. Information on known issues was reviewed to determine whether further evaluation or CCTV inspections were necessary to support a better understanding of the issue. More information on the Town's identified drainage issues is included in **Section 3** of this report.

- **Massachusetts MS4 General Permit Outfall Screening Program Data:** In 2020, the Town performed assessments of the Town's 355 stormwater outfalls in accordance with the 2016 Massachusetts Small MS4 General Permit Illicit Discharge Detection and Elimination Program requirements. Outfall investigations included visual assessments of outfalls during dry weather periods, defined as periods with no more than 0.1-inch of precipitation or significant snowmelt within the previous twenty-four (24) hours, to identify structures with flow during these conditions. Where dry weather flow was present, samples were collected at each outfall and analyzed for various parameters that could indicate the presence of a potential illicit discharge, or non-stormwater discharge to the storm drain system. Throughout the course of the Town's outfall investigations, twenty-seven (27) outfalls had dry weather flow sampling results that exceeded the MS4 General Permit criteria for identifying potential illicit discharges. Exceedance of this criteria can be indicative of a direct or indirect non-stormwater discharge, likely originating from a sewage source, and warrants further inspection. In addition, outfall assessments included documenting and photographing the general condition of each outfall. Of the 355 outfalls assessed, significant damage or deterioration was observed at twenty-one (21), and general damages or maintenance concerns were observed at 124. These outfall screening results were reviewed and considered when prioritizing investigations of storm drain infrastructure.

- **Upcoming Town Projects:** Pipe segments in roadways planned for paving were prioritized for rehabilitation to proactively remediate defects and prevent utility-related roadway deterioration (e.g., sinkholes).

A map of the existing data reviewed for this priority storm drain infrastructure evaluation is included as **Figure 5-1**, located in **Appendix C**.

After reviewing the existing stormwater infrastructure data provided by the Town, Woodard & Curran identified sixteen (16) areas as high priority for CCTV field investigations, as shown on **Figure 5-2**, located in **Appendix C**. The Town of Agawam engaged BMC to perform twelve (12) days of CCTV storm drain investigations based on the available budget to support this project.

5.2 Fieldwork & Methodology

BMC conducted CCTV inspections of all sixteen (16) areas identified as high priority for field investigation between January 4, 2021 and January 21, 2021. These inspections were conducted in accordance with the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) Version 7.0.3. In order to relate findings from inspections with the Town's GIS database, storm drainpipes and storm drain manholes assessed were identified during inspections by unique ID numbers, "DGM-XXX" and "DMH-XXX," respectively. The objective of this program was to assess and identify structural and O&M defects within the pipes, and to provide recommendations for future rehabilitation and maintenance, as needed. The CCTV inspection program focused on approximately 20,200 linear feet, or 3%, of the Town's storm drainpipe segments.



Photo 5-1: CB-5000-UN-56-955 – Example of a structural pipe defect (broken pipe).



Photo 5-2: CB-701-CB-1971 – Example of an O&M pipe defect (root ball barrel).

During the investigations, BMC assigned structural codes to pipe segments observed with physical defects, including cracks, fractures, breaks, holes, deformations, or collapses. O&M codes were assigned if infiltration was observed or the pipe segment required cleaning, grouting repair, or removal of obstructions, including settled deposits, roots, or vermin. The severity of the defect was designated by a defect grade, which ranges from 1 (a minor defect) to 5 (a significant defect), based upon the NASSCO PACP Condition Grading System. PACP is the North American Standard for pipeline defect identification and assessment, providing standardization and consistency to the methods in which pipeline conditions are identified, evaluated, and managed. **Table 5-1**, below, provides examples of defect types and grades.

Table 5-1: Examples of Pipe Defects and Severity

Defect Grade	Example of Structural Defects	Example of O&M Defects
1	○ Joint Separation ○ Increased Surface Roughness ○ Circumferential Crack or Fracture	○ Fine Roots at Lateral ○ Vermin (Cockroach or Other)
2	○ Surface Spalling ○ Longitudinal Crack or Fracture	○ Fine Roots at Barrel ○ Vermin (Rats) ○ Obstruction (<=10%) ○ Deposits Settled (<=10%)
3	○ Surface Aggregate Visible ○ Multiple Cracks or Fractures	○ Medium Roots at Lateral ○ Obstruction (<=20%) ○ Deposits Settled (<=20%)
4	○ Surface Aggregate Missing ○ Hinge Crack or Fractures	○ Medium Roots at Barrel ○ Obstruction (<=30%) ○ Deposits Settled (<=30%)

Defect Grade	Example of Structural Defects	Example of O&M Defects
5	o Reinforcement Visible o Hole (Soil Visible) o Pipe Collapse	o Root Ball at Barrel o Obstruction (>30%) o Deposits Settled (>30%)

It is important to note that PACP defect grading was initially developed for sanitary sewer pipes. Certain defects are more significant if observed in sanitary sewer collection systems than in stormwater drainage systems, such as infiltration-type defects. Depending on the identified defect type, elevated grades may not warrant the same level of concern in storm drain systems as they would in sanitary sewer collection systems. These differences were considered during review of the CCTV inspection results. An example of a NASSCO PACP Inspection Form is included in **Appendix C**.

5.3 Field Inspection Results

CCTV inspections of the sixteen (16) areas identified as high priority for field investigation documented 225 total pipe defects. These defects consisted of structural defects, such as cracks, fractures, and broken pipes, as well as O&M defects, such as settled deposits, root intrusion, and infiltration. CCTV inspection reports were developed for each pipe segment assessed and provide the following information: unique identification number, street name, inspection date, inspected length, pipe size and material, location of unmapped connections, location and severity of defects, photos of pipe condition, and NASSCO ratings. These CCTV inspection reports are included in **Appendix C**, along with a table summarizing the specific structural and O&M defects observed within each of the sixteen (16) areas identified as high priority for field investigation.

The storm drainpipe sizes inspected ranged from 10 to 48 inches in diameter, with most pipe sizes ranging from 15 to 36 inches. **Table 5-2**, below, summarizes the most common pipe defects observed by BMC during CCTV investigations.

Table 5-2: Summary of Observed Pipe Defects

Category	Type of Defect	NASSCO Ranking					Total
		5	4	3	2	1	
Broken Pipe	Structural	-	3	-	-	-	**3**
Fracture/Crack	Structural	-	1	10	35	4	**50**
Hole	Structural	-	1	-	-	-	**1**
Offset/Separated Joint	Structural	-	1	5	-	-	**6**
Surface Deterioration	Structural	-	2	1	-	-	**3**
Infiltration	O&M	2	44	39	-	40	**125**
Roots	O&M	2	-	18	-	14	**34**
Other - O&M	O&M	-	1	-	1	1	**3**
Total:		**4**	**53**	**73**	**36**	**59**	**225**

In addition to the defects summarized above, twenty-nine (29) tap break-ins, also referred to as unmapped pipe connections, were identified throughout CCTV inspections. Additional investigations to locate the source of these tap break-ins and to identify potential illicit connections are recommended. These investigations should be completed as part of the Town's ongoing MS4 General Permit Illicit Discharge Detection and Elimination Program (IDDE).



Photo 5-3: DMH-502-DMH-614 – Example of a tap break-in (unmapped pipe connection).

Over one third of the storm drainpipes inspected had defects warranting O&M and rehabilitation recommendations to improve drainage system capacities and prevent structural failures. The Town should continue to periodically monitor storm drainpipes that did not show defects requiring immediate attention.

Observations from the CCTV inspection were entered into a database for review and analysis. This database was used to develop recommendations for O&M, continuous monitoring, rehabilitation, and further analysis for the inspected pipes, as described below:

- **Operations and Maintenance**
    - Heavy Clean and CCTV: Pressure water wash is recommended for pipe segments exhibiting significant debris and build-up and pipe segments that could not be fully inspected during the initial CCTV fieldwork. Segments recommended for heavy cleaning should also be inspected via CCTV to identify potential deficiencies.
    - Continue to Monitor: In pipe segments where defects are non-existent or minor in significance and no immediate rehabilitation is recommended, continued monitoring is the best practice.
- **Rehabilitation**
    - Trenchless Rehabilitation: A manhole-to-manhole structural liner is recommended in pipe segments where leaking joints, cracks, or other structural defects are recurring throughout the majority of the pipe segment. A pipe liner essentially creates a new pipe within the existing pipe that restores the structural integrity of the pipe.
    - Open Cut Repair (Dig and Replace): An open cut repair is recommended in pipe segments that are damaged beyond repair by means of trenchless rehabilitation.
- **Drainage Study:** A drainage study is recommended where storm drainpipes appear to be undersized or are located within areas with historic flooding issues. The drainage study should include modeling the existing conditions within a project area and the proposed improvements and should be used as a basis for designing upgrades to a stormwater conveyance system.
- **Building Inspections:** Building inspections are recommended where laterals are observed in the mainline pipe to determine their source and to identify potential illicit connections.

Table 5-3, below, lists the estimated quantity of each storm drain recommendation category based on the CCTV inspection findings.

Table 5-3: Summary of Pipe Rehabilitation Recommendations

Rehabilitation Recommendation	Unit	Estimated Quantity
Heavy Clean and CCTV	Linear Foot	3,200
Continue to Monitor	Linear Foot	13,500
Trenchless Rehabilitation	Linear Foot	1,600
Open Cut Repair (Dig and Replace)	Linear Foot	450
Drainage Studies	Each	1
Building Inspections	Each	29

By reviewing the severity of the pipe defects and rehabilitation recommendations for each of the sixteen (16) high priority areas inspected during CCTV investigations, Woodard & Curran identified four specific locations in Town that require significant trenchless rehabilitation, open cut repair, drainage studies, or some combination of all three, including School Street, Princeton Avenue, Belvidere Avenue and Brookline Avenue, and Memorial Park. In addition, Woodard & Curran has identified four projects that should be funded on an annual basis to advance the Town's CCTV inspection program, the repair of deteriorated storm drainpipes and outfalls, and the Town's MS4 IDDE Program.

All eight (8) identified capital improvement projects are summarized in **Table 5-4**, below, as well as in the Storm Drain Infrastructure Priority Project Summary Table included in **Appendix C**.

Table 5-4: Priority Storm Drain Projects

Priority	Project Title	Comments and Observations
High	School Street Drainage Rehabilitation	Severe structural defects found in critical pipe segments (downstream network position).
High	Princeton Avenue Drainage Rehabilitation	Slope inconsistencies in pipe causing severe scouring and potential for pipe failure; outlet pipe segments disconnected and causing erosion.
High	Belvidere Avenue/Brookline Avenue Drainage Study and Upgrades	Historic flooding/capacity issues in area planned for paving between 2022 and 2026; damaged outfall causing significant erosion (WH-19-302).
Medium	Memorial Park Drainage Rehabilitation	Moderate to severe pipe defects identified requiring both trenched and trenchless rehabilitation; area planned for paving between 2022 and 2026; damaged outlet pipe causing significant erosion (TM-20-293).
Medium	Town-Wide Storm Drain CCTV Inspection Program	Conduct proactive and ongoing investigations to monitor storm drain infrastructure and identify defects prior to failure.
Medium	Town-Wide Storm Drain Rehabilitation	Provide heavy cleaning, trenchless rehabilitation, and/or open cut (dig and replace) services on an ongoing basis to address defects identified during Town-wide CCTV inspections.
Medium	Town-Wide Outfall Rehabilitation	Address damages and maintenance needs identified during MS4 dry weather outfall assessments.

Priority	Project Title	Comments and Observations
Medium	Town-Wide IDDE Program	Advance IDDE catchment investigation, wet weather outfall screening, and illicit discharge notification, abatement, and removal confirmation efforts for the duration of the MS4 General Permit cycle.

5.4 Recommendations

Woodard & Curran has determined priority rankings for four storm drain projects based off of the inspection of the approximately 20,200 linear feet of the Town's storm drainpipe. In addition to these four projects, Woodard & Curran has also identified four projects to be funded by annual allocations, with the goal of advancing the Town's CCTV inspection program, funding the repair of damaged storm drain infrastructure, and meeting the IDDE Program requirements of the MS4 General Permit.

Woodard & Curran has included all eight projects listed in **Table 5-4**, above, in the CIP, provided as **Appendix G** to this Plan. Capital improvement recommendations are further described in **Section 8** of this Plan.

6. DETENTION BASIN ASSESSMENT

Detention basins, as defined for the development of this Master Plan, are a subset of stormwater best management practices (BMPs), intended to store, and in some cases, treat stormwater runoff following storm events or snowmelt before releasing it in a controlled manner to receiving waters. Often, detention basins are considered during the stormwater management design process because of their ability to achieve one or more of the following goals:

- Promote stormwater infiltration and increase groundwater recharge;
- Detain stormwater and release it in a controlled manner to reduce peak rates of discharge and peak runoff volumes during large storm events; and
- Remove pollutants from stormwater flows including total suspended solids (TSS), nutrients, metals, organic matter, and other contaminants.

Existing detention basins can be retrofitted, or modified, to enhance existing qualities, add additional features to basins, or completely change the method of stormwater treatment provided by the basin. Detention basin retrofits are typically designed and constructed to increase a basin's storage capacity or to improve the quality of stormwater discharging from the basin. The detention basin retrofit assessment described herein was developed and implemented to assess all Town-owned detention basins, document the structural condition of each basin, and develop recommendations for rehabilitating and retrofitting basins.

6.1 Desktop Analysis

Woodard & Curran conducted a desktop analysis of available GIS data to determine ownership of the known detention basins located in the Town and their approximate contributing area. The analysis concluded that the Town owns and maintains at least sixty-three (63) stormwater detention basins. **Figures 6-1** through **6-5**, located in **Appendix D**, show the locations of detention basins in Agawam.

6.2 Assessment Methodology

Prior to conducting detention basin assessments, Woodard & Curran developed a web-based form using the Collector Application, similar to the one developed for the culvert assessment described in **Section 4.1.2.1** of this Plan. The form was used to record information during detention basin assessments, including location, ownership, and an assessment of the basin's overall condition and retrofit potential.

6.2.1 *Condition Assessment*

There are several critical attributes that contribute to a detention basin's ability to operate efficiently and as intended. The condition assessment section of the detention basin assessment form was developed to document the current condition of these critical attributes, including the following:

- Condition of embankments, side slopes, pretreatment measures (e.g. sediment forebays), impoundment area, inlet(s), outlet control structure, trash rack(s), spillway(s), and plantings;
- Whether woody vegetation was observed on the embankments or side slopes of the basin;
- Whether damages to the basin caused by burrowing rodents were observed on the embankments or side slopes; and
- Whether the basin had adequate means of access for maintenance vehicles and equipment.

The condition of detention basin attributes was rated based on their present need or anticipated future need for maintenance. There were five (5) different condition options to choose from in the assessment form: Not a Problem, Monitor, Work Needed, Not Applicable, and Unknown. The condition assessment section of the form also included a comments section, allowing the inspector to provide details on any maintenance needs, damages, accessibility issues, and any other general notes. An example assessment form is provided in **Appendix D**.

6.2.2 *Retrofit Assessment*

The detention basin assessment form included a retrofit field, allowing inspectors to rate each basin's retrofit potential as Low, Medium, or High. The form also included a comments section for the inspector to provide details on any retrofit opportunities identified at each basin. In general, field crews were looking for opportunities to increase each basin's storage capacity by deepening basins, widening basins, or installing or altering outlet control structures, and to improve water quality by installing sediment forebays, increasing basin plantings, or other methods, furthering the basin's potential to remove pollutants. Whether or not these opportunities were identified during basin assessments were the primary factor in deciding retrofit potential rankings for each basin; depending on the number of opportunities identified for each basin, the retrofit potential rating increased from "Low" to either "Medium" or "High." Other factors that contributed to the retrofit rankings included accessibility for (re)construction, proximity to residences and commercial properties that could be impacted by construction activities, proximity to wetland resource areas, flood plains, impaired waterbodies, and other environmentally sensitive areas, and the contributing area that would benefit from the proposed retrofits. A complete overview of all detention basin retrofit assessment results is included in **Appendix D**.

6.3 Assessment Results

On November 16 through 18, 2020, Woodard & Curran visited the sixty-three (63) locations presumed to be Town-owned stormwater detention basins. Of these locations, one (MGMT-53) was reclassified as privately owned, two (MGMT-8 and MGMT-32) were reclassified as subsurface stormwater detention systems, and one (MGMT-9) was reclassified as a leaching catch basin, leaving fifty-nine (59) basins for assessment. There were thirty-seven (37) detention basins with at least one attribute ranked as "Work Needed," however, there were no detention basins observed that were in critical need of repair. Structural repairs, large-scale maintenance, or a combination of both are recommended for thirty (30) detention basins, general maintenance is recommended for fifty-five (55) basins, and thirty-four (34) basins had retrofit potential rankings of "Medium" or "High."



Photo 6-1: MGMT-37 – Example of an overgrown detention basin.

Table 6-2, below, summarizes the results of the detention basin field assessments.

Table 6-2: Summary of Detention Basin Assessment Results

Basin Attribute	Category of Attribute	Field Ranking			
		Work Needed	Monitor	Not a Problem	Unknown/ Not Applicable
Condition of Embankment	Structural	9	8	42	-
Condition of Side Slopes	Structural	10	20	29	-
Condition of Impoundment Area	Structural	9	7	43	-
Condition of Spillway	Structural	4	6	29	20
Woody Vegetation on Embankments/Side Slopes	Structural/O&M	6	8	16	29
Condition of Inlet	Structural/O&M	22	16	18	3
Condition of Outlet Control Structure	Structural/O&M	9	9	28	13
Condition of Pretreatment Measures	Structural/O&M	-	1	8	50
Condition of Plantings	O&M	4	4	34	17
Condition of Trash Racks	O&M	4	2	12	41
Rodent Control	O&M	3	7	40	9
Maintenance Access	O&M	8	7	44	-

A complete overview of all detention basin assessment results, including comments and initial retrofit rankings, are included in **Appendix D**. **Photos 6-1** through **6-3**, included throughout this section, show examples of the types of structural and large-scale maintenance deficiencies observed during detention basin assessments.

6.3.1 *Structural and Large-Scale Maintenance Deficiencies Observed*

During the assessment of the fifty-nine (59) Town-owned detention basins, thirty (30) basins were observed with structural and/or maintenance deficiencies preventing specific basin features, or in some cases entire basins, from functioning as intended. A complete list of the thirty (30) detention basins requiring rehabilitation is included in **Appendix D** and includes the field Engineer's comments regarding all deficiencies observed for each basin. There were no detention basins identified during the assessments with structural or large-scale maintenance deficiencies that could lead to the immediate failure of a basin.



Photo 6-2: MGMT-37 – Example of a tree growing through a basin's inlet pipe.

Table 6-3, below, summarizes this information for the top ten (10) priority detention basin rehabilitation projects.

Table 6-3: Top 10 Priority Detention Basin Rehabilitation Projects

Priority	Basin ID	Comments and Observations
High	MGMT-56	Landowners abutting the basin have imported sand into the basin to create a dirt bike track; large rodent holes observed throughout the basin's impoundment and embankments; the locations of the inlet pipe and outlet control structure are completely overgrown.
High	MGMT-31	Embankments are eroded and appear to be in unstable condition; unmapped 30-inch, 6-inch, and 4-inch inlets with no headwall in the southwest corner of the basin; possible illicit discharge entering the basin through the southwest inlets.
High	MGMT-15	Basin is completely overgrown; emergency spillway and embankment surrounding outlet pipe are eroding; flared end section of outlet pipe is disconnected; erosion observed along the base of the impoundment area.
High	MGMT-28	Basin is completely overgrown; significant erosion downstream of inlet headwall; erosion caused by small stream running through basin; erosion caused by driveway runoff traveling via overland flow to basin; outlet pipe buried.
High	MGMT-14	Tree growing through inlet pipe; rodent holes inside slopes; embankment surrounding outlet is eroding.
High	MGMT-5	Basin is completely overgrown; side slopes are eroding and are partially collapsed in some locations; approximately half of perimeter chain link fence is damaged.
Medium	MGMT-49	Tree growing through northeast inlet pipe; bare soil adjacent to basin likely causing sedimentation in the basin.
Medium	MGMT-12	Basin is completely overgrown; tree growing through outlet control structure.
Medium	MGMT-27	Basin is completely overgrown; tree growing through inlet pipe.
Medium	MGMT-29	Basin is completely overgrown; outlet control structure significantly damaged.

In addition to these ten (10) priority rehabilitation projects, the Town should allocate annual funding to repair the remaining detention basins with identified structural and/or maintenance deficiencies to keep them functioning as intended.

6.3.2 *General Maintenance Deficiencies Observed*

During the assessment of the Town-owned detention basins, fifty-five (55) of the fifty-nine (59) basins were observed with general maintenance deficiencies. Examples of the types of deficiencies observed include erosion at basin inlets and outlets, buried inlets and outlets, damaged trash racks on outlet control structures, sediment and leaf litter debris accumulating within impoundment areas, inlets and outlets, lack of vegetative growth, rodent holes on basin side slopes and impoundment areas, lack of maintenance for basin plantings, and damages basin to perimeter fencing. An overview of the maintenance deficiencies observed at each detention basin is included in the detention basin assessment results tables are included in **Appendix D**.



Photo 6-3: MGMT-56 – Example of rodent holes in a basin's impoundment area.

Regular inspection and maintenance of detention basins is essential for keeping basins functioning as designed. In general, it is recommended that the Town inspect and perform maintenance on their detention basins at least once per year.

6.3.3 *Retrofit Findings*

During the assessment of the municipally owned detention basins, thirteen (13) of the fifty-nine (59) basins were identified with a High retrofit potential, twenty-one (21) with Medium potential, and twenty-five (25) with Low retrofit potential. Several retrofit opportunities were identified during field assessments, ranging from small additions or alterations to large-scale basin reconstruction. Possible retrofit options identified during the assessments are as follows:

- **Options considered to increase basin storage capacity:** Install or raise the lowest outlet on the outlet control structure, raise the basin's embankments or spillway, deepen the basin, laterally expand the basin's footprint, or direct additional stormwater flows to basins if they are over-sized.

- **Options considered to improve water quality:** Install a sediment forebay or other appropriate pretreatment measure, establish or replace basin plantings, install riprap at the basin's inlet, outlet, or emergency spillway to dissipate the energy of flowing stormwater and to prevent erosion, relocate basin's inlet or outlet to increase the stormwater's flow path across the basin, or install a trash rack or media filter at the basin's outlet.

6.3.3.1 Additional Desktop Review of Retrofit Potential

Following field inspections, Woodard & Curran conducted a desktop review of the initial field detention basin retrofit rankings to further prioritize and identify retrofit potential for each basin. Some of the information considered for further prioritizing the basin retrofits included:

- **Volume Expansion:** Is there space available for horizontal or vertical expansion? Horizontal expansion would expand the basins footprint while vertical expansion would increase berm heights or require excavation below the bottom of the basin.

- **Pretreatment:** Is there space available for potential pretreatment systems including sediment forebays or proprietary treatment devices? Pretreating stormwater would improve the quality of water discharging from the basin.

- **Plantings:** Could plantings be added to the basin without significantly altering the basin's functionality? Plantings would help filter nutrients and sediment from stormwater prior to discharging from the basin.

- **Contributing Area:** How large is the area that contributes to the basin and what is the land use for the area? Land uses that generate high pollutant loads may require more intensive retrofit designs than those that are undeveloped.

- **Basin Accessibility for Construction:** Is the detention basin easily accessible to construct the proposed retrofits? Will extensive clearing and private property access be required? Accessibility issues could significantly increase the cost of a retrofit project.

- **Proximity to Residences and Commercial Properties:** How close is the detention basin to a residential or commercial property? Would residents or workers be disrupted by the construction of detention basin retrofits? If retrofit construction is anticipated to last for a short duration, disruption to nearby properties may be minimal.

- **Proximity to Environmentally Sensitive Areas:** Is the detention basin in close proximity to wetland resource areas, flood plains, impaired waterbodies, or other environmentally sensitive areas? Retrofit projects in these areas may provide the greatest environmental benefit.

As a result of the desktop analysis, retrofit opportunities were identified and assigned to each of the assessed basins. From the list of assessed basins, ten (10) were selected as potential projects to be included in the Capital Improvements Plan. **Table 6-4** below shows the priority basin projects including potential retrofit and education opportunities. Individual CIP sheets for the following ten (10) projects are included in **Appendix G**.

Table 6-4: Top 10 Priority Detention Basin Retrofit Projects

Priority	Basin ID	Comments and Observations
High	MGMT-41	Potential to: increase basin storage capacity by deepening basin or raising embankment elevations; increase basin plantings to filter and settle out pollutants. Located within flood plain (1% annual chance of flooding, with BFE).
High	MGMT-10	Potential to: install a sediment forebay to address sediment buildup and erosion observed during inspection; increase basin storage capacity by widening or deepening basin or installing an outlet control structure; increase basin plantings to filter and settle out pollutants. In close proximity to flood plain (1% annual chance of flooding, with BFE).
High	MGMT-26	Potential to: increase basin storage capacity by installing an outlet control structure; increase basin plantings to filter and settle out pollutants. In close proximity to wetlands.
High	MGMT-20	Potential to: install a sediment forebay to address sediment buildup and erosion observed during inspection; install a riprap apron at the basin's outlet. In close proximity to Robinson State Park and White Brook.
High	MGMT-60	Potential to: install a sediment forebay to address sediment buildup observed during inspection; increase storage capacity by modifying outlet control structure. In close proximity to Robinson State Park.
High	MGMT-38	Potential to: install a sediment forebay to address sediment buildup observed during inspection. In close proximity to Three mile Brook and flood plain (1% annual chance of flooding, with BFE).
High	MGMT-19	Potential to: install a riprap apron or sediment forebay at the location of the basin's inlet to address erosion observed during inspection; increase basin storage capacity by installing an outlet control structure; increase basin plantings to filter and settle out pollutants. In close proximity to stream.
High	MGMT-44	Potential to: install a sediment forebay to address sediment buildup and erosion observed during inspection; increase basin plantings to filter and settle out pollutants. In close proximity to the Connecticut River.
High	MGMT-22	Potential to: install a sediment forebay to address sediment buildup observed during inspection; shorten the basin's inlet pipe to increase the flow path between the inlet and outlet control structure.
High	MGMT-31*	Potential to: address the potential illicit discharge observed during inspection; install a headwall is the southwestern corner of the basin to stabilize the basin's embankment.

*Note: MGMT-31 was also identified as a detention basin rehabilitation project; this project is listed as a detention basin rehabilitation project in the CIP.

6.4 Recommendations

Woodard & Curran has calculated priority rankings for detention basin rehabilitation and retrofit projects based off of the field assessment for each of the fifty-nine (59) Town-owned detention basins. The Town may choose to implement a rotating assessment schedule for each Town-owned detention basin to identify necessary O&M activities, including clearing debris and sediment and repairing structural damages to keep the basins functioning as designed. Tables summarizing detention basin inspection results and priority rankings for rehabilitation and retrofit projects are provided in **Appendix B**.

Woodard & Curran has included the top ten (10) priority detention basin rehabilitation projects and the top ten (10) priority detention basin retrofit projects in the CIP, provided as **Appendix G** to this Plan. Capital improvement recommendations, including allocating annual funding to inspect and maintain detention basins, are further described in **Section 8** of this Plan.

7. REGULATORY & DESIGN ASSESSMENT

7.1 Impervious Area Mitigation Assessment

Woodard & Curran developed an Impervious Area Mitigation Assessment to identify feasible impervious area mitigation strategies that the Town can integrate into its stormwater management program and public and private development and redevelopment projects. Impervious areas prevent precipitation and stormwater runoff from infiltrating into soils and the ground surface, resulting in increased stormwater runoff and reduced groundwater recharge. The strategies developed within the Impervious Area Mitigation Assessment will help the Town advance its goals of protecting their water resources, implementing sustainable and resilient practices in the face of climate change, and maintaining the safety and wellbeing of Agawam's residents and visitors, alike. The following sections present the summary of the Impervious Area Mitigation Assessment.

7.1.1 *Impervious Areas*

Agawam has approximately 2,480 acres of Town-, State-, and privately-owned impervious areas, accounting for approximately 17% of the land cover within the Town. A breakdown of impervious areas by property type is provided in **Table 7-1**, below:

Table 7-1: Impervious Area by Property Type

Property Type	IA (Acres)	% Town-wide
Residential	981	40%
Commercial	497	20%
Private (Other)	131	5%
Town Facilities	73	3%
State Facilities	25	1%
Federal	3	0.1%
Total Roads	769	31%
*Town Roads**	647	26%
MassDOT Roads	98	4%
State Park or Forest Roads	16	0.6%
Undetermined Roads	8	0.3%
Total	**2,478**	**100%**

Note: *Includes accepted and unaccepted roads.

As shown in **Table 7-1**, above, residential properties represent 40% of the total impervious area in Town, roads represent 31% of the total impervious areas in Town, and commercial and private properties represent 25% of the total impervious areas in Town. Residential properties have a low benefit to cost ratio for impervious area mitigation based on the small amount of impervious area per parcel, however impervious area management and mitigation at a neighborhood level can be beneficial. Reduction of lane widths associated with municipally-owned roads presents a great opportunity to mitigate impervious area throughout the Town. Lastly, commercial, and private, properties have a significant ability to mitigate impervious area through redevelopment.

7.1.2 *Impervious Area Mitigation Strategies*

Various approaches to mitigate the effects of impervious areas on surrounding environments have been developed including impervious area removal, impervious area disconnection, and impervious area impact reduction. These strategies can be implemented using some of the following strategies:

- **Porous Pavement:** Provides storage for stormwater runoff by allowing stormwater to infiltrate into subsurface soils which increases groundwater recharge, decreases stormwater runoff volumes and peak rates of discharge, and provides stormwater treatment.

- **Soil Restoration:** Adds organic material which improves compacted and crusted soils and subbases which reduces stormwater runoff, promotes enhanced stormwater infiltration, and improves stormwater runoff quality.

- **Shared Impervious Areas:** Minimizes parking area size by sharing parking among owners that have different peak parking characteristics that vary by time of day, day of week, and/or season of the year which results in a reduction of impervious area.

- **Impervious Area Disconnection:** Directs stormwater runoff from impervious areas, such as pavement and rooftops, to permeable surfaces or stormwater BMPs rather than directly connecting into a stormwater conveyance system which reduces the amount of stormwater entering the conveyance system, increases infiltration and treatment potential, and decreases stormwater off volumes and peak rates of discharge.

- **Green Roofs:** Reduces stormwater runoff by capturing and temporarily storing stormwater within the permanently vegetated system which reduced stormwater runoff from the building's roof and improves stormwater runoff quality.

- **Increasing Tree Canopy Cover:** Increases tree canopy by planting trees in locations where impervious area removal or disconnection is infeasible which reduces ground temperatures, intercepts rainfall and snowfall, increases soil water infiltration, improves air quality, and beautifies the community.

These strategies, when incorporated into the Municipal Code, will improve the resiliency to the effects of climate change by reducing the burden on the Town's infrastructure. The entire impervious area mitigation strategy report is provided as **Appendix E**.

7.2 Municipal Code Audit

To ensure that development and redevelopment projects in Agawam conform with best practices as climate changes, regulatory review has been an important element of the Town's MVP work. For Agawam, the greatest climate change considerations involve increased heat, including warmer winters and increased number of summer days of 90 degrees or more, and greater variability in rainfall, including greater frequency of larger storms and increasing consecutive dry days. Fortunately, strategies to deal with these changes are fully complementary in that reduced impervious cover and greater use of green infrastructure help to cool during hot temperatures, as well as create a landscape more able to absorb increased rainfall that reduces runoff volumes, but also infiltrates to help sustain ecosystems and human communities through dryer periods.

As such, the overall aim of regulatory review work with the Town has been to institute development and redevelopment project review processes and standards that advance low impact approaches, including reductions in impervious cover, wider use of green infrastructure, nature-based solutions, and trees. At the same time, regulatory review work helped with Town compliance on new requirements under the State's Flood Hazard Mitigation and National Flood Insurance programs and EPA and MassDEP's MS4 permit.

PVPC staff met a total of seven (7) times with the Town's Regulatory Review Advisory Working Group. At the first meeting, PVPC presented an overview of the proposed work to be covered and facilitated discussion about the best approach for updating the Town's regulations. Meetings 2 through 5 focused on extracting stormwater management requirements and standards from the General Code of Ordinances, Chapter 175 – Water and Sewers, to create a stand-alone Chapter 176 devoted to stormwater management with associated detailed stormwater management regulations. Meeting 6 focused on Low Impact Development (LID) practices and integrating improved policies and standards within the Town's Zoning Ordinance and Subdivision Rules and Regulations. Meeting 7 focused on furthering the development of a local Wetlands Protection Ordinance, creating a new local Green Streets and Infrastructure Policy, and updating the Flood Plain Overlay District within the Zoning Ordinance.

7.2.1 *Municipal Code Recommendations*

While more detailed specifics on recommendations are indicated in the Memorandum in **Appendix F** of this Master Plan, key recommendations for the Town's municipal code, intended to promote greater resilience, are as follows:

- Better integration of LID from project initiation to finished project, starting with a pre-application and concept plan meeting within stormwater management permitting that gets project proponents thinking early in the process about an LID approach.

- Rainfall data recommendations that currently tie to NOAA14+ (what MassDEP has indicated it will include in the updated Massachusetts Stormwater Handbook) to account for current precipitation. The working group talked about considerations of future rainfall amounts through the work of the Resilient Massachusetts Action Team and agreed it will be important once the tool has been finalized to determine whether an updated approach to rainfall data use should be adopted for local projects.

- Requirement of LID in all development and redevelopment projects to meet volume and pollutant removal objectives and to reduce impervious surface. This includes alternative design for streets, driveways, and parking.

- LID standards that include some new specifications on tree protection, mitigation of impacts to riparian buffers and coldwater fisheries, and avoidance of soil compaction, and avoidance of excessive impervious cover in right-of-ways and street designs and layouts, parking and parking lots, and landscaping that further enables stormwater management.

7.3 Implementation of Strategies and Recommendations

Woodard & Curran, PVPC, and the Town of Agawam have worked together to identify several impervious area mitigation strategies and recommendations for updates to the Town's regulations. These strategies and recommendations are intended to support the Town with reducing its impervious area footprint, developing clear and concise local regulations that guide developers to implement stormwater treatment BMPs and LID techniques, and to ultimately improve water quality throughout Agawam.

Next steps for the implementation of the strategies and recommendations discussed in **Sections 7.1** and **7.2** are as follows:

- The Town's Zoning Advisory Committee will be considering the newly developed stormwater regulation, Chapter 176 of the General Code of Ordinances, in July 2021. The Advisory Committee will also be considering updates to Chapter 159 – Subdivision of Land and Chapter 180 – Zoning at upcoming meetings.

- The Town's Regulatory Review Advisory Working Group will continue to finalize the development of the new stormwater regulation, Chapter 176, and finalize updates to Chapter 175 – Water and Sewers as well.

- Town staff will need to present all proposed regulatory updates at three (3) Town Council meetings to solicit public input before any changes to the Town's regulations can be officially adopted.

8. CAPITAL IMPROVEMENT PLAN

As a result of the efforts conducted to complete this Master Plan, Woodard & Curran has identified regulatory, operational, and capital recommendations and capital improvement projects that aim to mitigate impacts resulting from climate change, maintain existing storm drain infrastructure, improve the condition of deteriorating infrastructure, and address known flooding issues in Agawam. To aid the Town in future decision making, Woodard & Curran prioritized each project type, an OPC, and CIP summary sheets for projects identified in this plan. This CIP was developed with a 10-year planning horizon based on estimated funds available to the Town. The following sections describe these recommendations and capital improvement projects in more detail.

8.1 Regulatory & Design Recommendations

The purpose of this Master Plan is to address expressed community concern regarding chronic and intensifying flooding resulting from climate change. The following sections describe regulatory and design recommendations the Town should consider when planning for the future and developing stormwater infrastructure projects.

8.1.1 *Municipal Code and Policy Recommendations*

In the development of this Master Plan, PVPC audited the Town's municipal codes to identify where climate resiliency measures could be included into the code. This effort included the development of a new Green Streets and Infrastructure Policy to govern all projects, a new stormwater ordinance, and amending existing development standards to address new private development and redevelopment projects. The recommendations made by PVPC are provided in **Appendix F** and summarized below.

PVPC staff met with the Town of Agawam's Regulatory Review Advisory Working Group seven times to present proposed ordinance and regulation changes, discuss the best approach to implement these changes, and implement these changes. As a result of these meetings, stormwater management requirements and standards were removed from the General Code of Ordinances Chapter 175 to create a stand-alone Chapter 176, devoted to stormwater management. In addition, the Town's Zoning Ordinance and Subdivision Rules and Regulations were revised to integrate low impact development practices. Lastly, the group worked to develop a local Wetlands Protection Ordinance and a new local Green Streets and Infrastructure Policy and update the Flood Plain Overlay District within the Zoning Ordinance.

Increased storm intensity and frequency resulting from climate change will impact the municipal storm drain system because existing infrastructure has not been designed to contain and convey future projected storm events, as described in Climate Impact Assessment provided in **Appendix A**. To ensure future designs are resilient to climate change, the Town must require new public and private stormwater infrastructure projects be designed using the NOAA 14+ rainfall precipitation data and require minimum pipe sizes that anticipate an increase in storm frequency and intensity.

8.1.2 *Impervious Area Mitigation Strategy Recommendation*

Woodard & Curran has identified seventeen (17) municipally owned properties with more than one (1) acre of impervious area. These properties combined include more than seventy (70) acres of impervious area. These properties should be a high priority to implement impervious area mitigation strategies and other stormwater management retrofits. Further evaluation of these properties to identify opportunities for impervious area removal, impervious area disconnection, and impervious area impact reduction should be considered.

8.1.3 *Storm Drain Modeling Recommendations*

To better understand sources of flooding and deficiencies present within the municipal drain system, the Town should consider developing a town-wide hydrologic and hydraulic model of its drainage system. The model would consider

specific factors such as land use, imperviousness, and hydrologic soil groups to calculate a reasonable curve number which would be used in conjunction with updated precipitation data to calculate runoff from each of the Town's sub-watersheds during various storm events and scenarios. The model would route the calculated runoff through the system, identifying conveyance deficiencies and strategic locations for storm drain improvements.

8.2 Capital Improvement Projects

Woodard & Curran identified a total of forty-one (41) capital improvement projects as a result of the assessments conducted as part of this Master Plan. Of the forty-one (41) projects, thirty-three (33) represent infrastructure improvement or rehabilitation projects, two (2) public outreach projects, and six (6) represent reoccurring annual allocations for maintenance and planning projects. In addition to the forty-one (41) projects identified through the assessments detailed in the Plan, an additional thirteen (13) Town-identified capital projects were added to the capital planning project recommendations to address known flooding and structural deterioration issues. The projects included in the CIP are in various stages of development including planning, conceptual, design, and shovel ready. Most of the projects identified in the CIP are in the planning and conceptual stages. Generally, these projects have been identified as the top priority projects from each section of this plan. Each of the projects are further described, including the project name, location, status, and estimated OPC in **Appendix G**.

8.2.1 *Capital Improvement Project Stages*

The infrastructure improvement or rehabilitation projects identified for the capital plan are generally broken down into one the following four (4) stages:

- Planning
- Conceptual
- Design
- Shovel Ready

Planning projects are considered projects where feasibility studies are conducted to determine if the project is worth pursuing from an engineering, permitting, and cost perspective. In the planning stage, preliminary alternatives can be chosen, permitting needs can be identified, and project practicality can be determined. Once it has been determined that a project is feasible, it moves into the conceptual phase where alternatives analysis and preliminary modeling efforts, if necessary, are conducted to help inform the design of a project. During this phase, survey, geotechnical studies, and resource area delineations are performed. Next, a project moves into the design phase that includes an engineering design of the selected alternative, as determined in the conceptual phase, and permitting. Lastly, the project moved into the shovel ready phase, where the design has been finalized, permits have been approved and acquired, and the project is ready to be constructed.

8.2.2 *Infrastructure Improvement or Rehabilitation Projects*

Capital improvement projects that were developed to improve or rehabilitate infrastructure identified as part of the assessments outlined in **Sections 4**, **5**, and **6** of this Plan fall under this category. The following sections outline how the specific assessments were utilized to select priority projects to be included in the CIP.

8.2.2.1 Culvert Projects

Based on the results of the risk analysis summarized in **Section 4** of this Plan, ten (10) culvert replacement or rehabilitation capital improvement projects have been identified and included in the CIP. The projects selected focus on removing the greatest risks to the system by replacing or rehabilitating the assets identified within the "immediate action" and "high priority renewal" risk categories. To better allocate the Town's available capital funds, the life of some culverts could be extended by rehabilitating the culvert through rehabilitation as an alternative to replacement. While

culvert rehabilitation is a more financially feasible option, rehabilitation will not improve the hydraulic capacity of the culvert which may be necessary to prevent flooding, reduce bank and channel erosion adjacent to the crossing, and may benefit wildlife crossing ability. The CIP does not include any O&M that should be performed on a rotating basis to maintain the hydraulic functionality of each crossing.

8.2.2.2 Storm Drain Projects

The CIP includes four (4) priority storm drain projects identified to improve the hydraulic capacity and functionality of the storm drain system and rehabilitate structural defects identified within the system based on the field investigation summarized in **Section 5** of this Plan. These four (4) projects were prioritized based upon the severity and frequency of structural and O&M defects observed during CCTV inspections, and will require significant trenchless rehabilitation, open cut repair, drainage studies, or some combination of all three to address defects.

In addition to the four (4) projects identified as part of this Master Plan, thirteen (13) Town-identified storm drain capital improvement projects, described in **Section 3** of this Plan, have been included in the CIP. These projects include drainage upgrades, drainage studies, and outfall repairs.

8.2.2.3 Detention Basin Projects

Based on the detention basin assessment summarized in **Section 6** of this Plan, ten (10) detention basin rehabilitation projects have been identified and included in the CIP. Detention basin rehabilitation projects were prioritized based upon the quantity of large-scale structural and O&M basin defects observed during field assessment. Detention basin retrofit opportunities were also identified and included in the CIP. In total, ten (10) detention basins identified with high retrofit potential, determined based on opportunities to increase storage capacity, and improve water quality, have been included in the CIP.

8.2.3 *Public Outreach Projects*

Public outreach and engagement is crucial to the success of any project especially municipal infrastructure projects. Because of this, each capital improvement project included in this Master Plan includes some minimum level of engagement of the general public in the estimate of engineering design services. However, it should be noted that if grant funding is sought for the projects herein (see **Section 8.3.1**), additional public outreach requirements may be needed above and beyond traditional public meetings for engineering and construction projects.

An example of the effort that may be required for effective public outreach is the work performed by PVPC, the Enchanted Circle Theatre (ECT), and the Hitchcock Center for the Environment, as part of the grant funded project to develop this Master Plan and CIP. This project included a robust public engagement program and included a video production by high school students, a school art residency program with 5th grade classrooms, a storm drain art and Earth Expo event, and a community survey. The high school video production project was used as an introduction to the art residence program and the school residency program, which aims to develop public art to relay messaging around clean water. The Earth Expo event displayed the artwork that was created during the residency program and introduced the Master Plan and regulatory review work. The community survey was intended to obtain a better sense of lived experiences and changing weather to gauge support for local efforts in to adapting to climate change. A summary of the Community Engagement developed for this Master Plan and CIP is provided in **Appendix H** of this Plan.

To continue to build upon the successful public outreach program developed for this project, the CIP includes two (2) public outreach projects. The first project will provide outreach to private property owners about the importance of maintaining privately owned detention basins. The second outreach project will create a demonstration of impervious area mitigation strategies at municipally owned properties and have been included in the CIP.

Woodard & Curran recommends allocating $50,000 to create a "How to Take Care of Your Basin" educational guide to be distributed to owners of private detention basins. In addition, Woodard & Curran recommends allocating $40,000 to evaluate and identify opportunities for impervious area removal, impervious area disconnection, and impervious area impact reduction at these municipally owned properties. This evaluation will be conducted on the seventeen (17) municipally-owned properties that have more than one (1) acre of impervious area. Mitigating impervious areas at municipal properties is an effective approach to support public outreach about impervious area mitigation in highly visible areas.

8.2.4 *Reoccurring Annual Allocations*

In addition to identifying specific culvert, storm drain, and detention basin projects, Woodard & Curran also recommends creating annual allocations to advance the Town's MS4 program, maintain infrastructure and detention basins, strategically repair deteriorated sections of storm drain, and model the Town's storm drainage infrastructure. The purpose of these allocations is to help address the highest priority projects, extend the life of aging infrastructure, and advance the assessment, design, and maintenance of infrastructure not identified as high priorities in this Master Plan.

To advance the Town's MS4 program, Woodard & Curran recommends allocating $100,000 for continued IDDE catchment investigations required by the MS4 permit and $50,000 annually to repair deteriorating or clogged outfalls. In addition to the nineteen (19) projects identified as part of the detention basin assessment, Woodard & Curran is recommending that the Town allocate $50,000 annually for O&M needs to maintain the functionality of the basins. In addition to the four projects identified as part of the storm drain assessment, Woodard & Curran is recommending that the Town allocates $50,000 annually for storm drain cleaning and CCTV investigations and $100,000 annually to repair structural deficiencies identified during future annual CCTV investigation. Lastly, Woodard & Curran recommends allocating $150,000 per year to develop a town-wide hydrologic and hydraulic model of the municipal storm drain system. By allocating funds on an annual basis rather than modeling the entire system at one time, the Town will reserve remaining capital resources to fund other projects identified in the CIP.

8.3 Opinion of Probable Costs

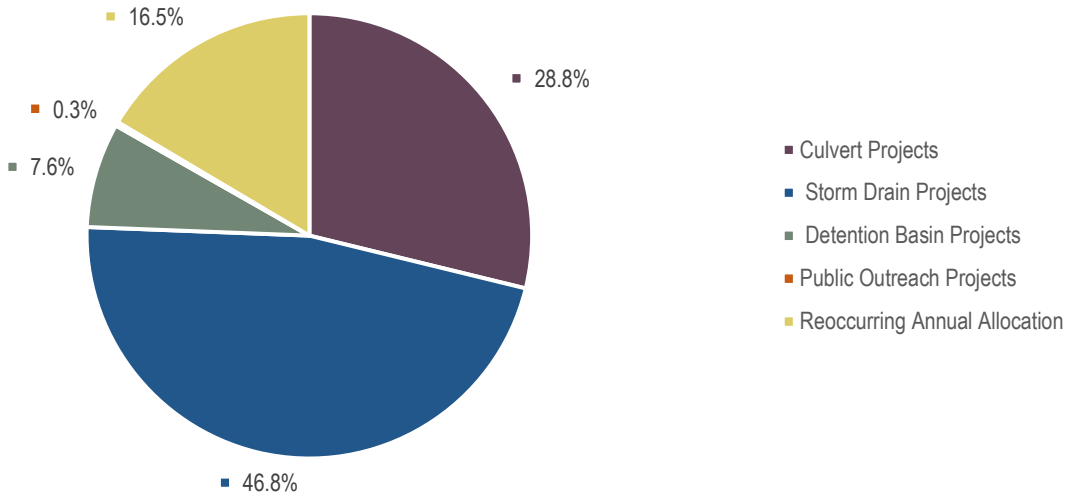
Woodard & Curran has completed preliminary cost estimates for each capital improvement project identified in this Master Plan. As projects move through planning and conceptual stages into design and shovel ready stages, these cost estimates are subject to change based more detailed site conditions. The estimated overall capital need for all individual projects and annual allocation projects included in the CIP is $30,375,000 in 2021 dollars. **Table 8-1** below breaks down the estimated cost by project type.

Table 8-1: Opinion of Probable Cost Breakdown by Project Type for 10-Year CIP

Project	Estimated Cost (2021 $)	Percentage (%)
Culvert Replacement	$8,740,000	28.8%
Detention Basin – Rehabilitation	$1,245,000	4.1%
Detention Basin – Retrofit	$1,065,000	3.5%
Storm Drain Rehabilitation/Upgrades	$14,235,000	46.8%
Total Infrastructure Improvement or Rehabilitation Projects Cost	*$25,285,000*	*83.2%*
Detention Basin Maintenance Guide	$50,000	0.2%
Impervious Area Mitigation Evaluation	$40,000	0.1%
Total Public Outreach Projects Cost	*$90,000*	*0.3%*
Detention Basin Maintenance (Annual Allocation - $50,000)	$500,000	1.7%
Outfall Repairs (Annual Allocation - $50,000)	$500,000	1.7%
CCTV & Heavy Cleaning (Annual Allocation - $50,000)	$500,000	1.7%
CCTV Investigation Repairs (Annual Allocation - $100,000)	$1,000,000	3.3%
IDDE Catchment Investigations (Annual Allocation - $100,000)	$1,000,000	3.3%
Town-Wide Hydrologic & Hydraulic Model (Annual Allocation - $150,000)	$1,500,000	4.8%
Total Reoccurring Annual Allocation Projects Cost	*$5,000,000*	*16.5%*
TOTAL COST	**$30,375,000**	**100%**

As shown in the table above, infrastructure improvement or rehabilitation capital projects represent more than 80% of the total cost of the CIP. Culvert replacement projects represent nearly 30% of the total cost of the CIP. On average, the cost to design, permit, and construct a replacement culvert identified in the CIP is $874,000. Detention basin rehabilitation and retrofit projects combine to represent almost 8% of the CIP with the average cost to complete each project being $120,000. Storm drain projects, which includes rehabilitation projects, storm drain upgrades, drainage studies, and outfall repairs, represents more than 45% of the CIP with nineteen (19) total projects. The cost to complete a storm drain project ranges from $30,000 to $3,160,000. **Figure 8-1**, below, shows a breakdown of the total CIP funding needs for infrastructure improvement and rehabilitation projects as compared to public outreach projects and reoccurring annual allocation projects.

Figure 8-1: CIP Funding Needs Project Type Breakdown



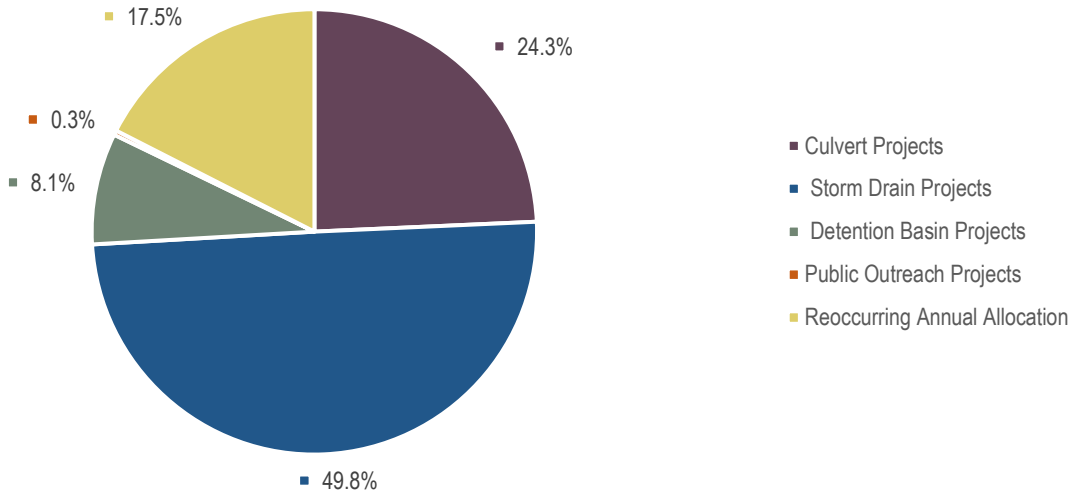
As depicted in **Table 8-1** and **Figure 8-1** above projects with annual cost allocations total $5,000,000 in 2021 dollars, represent 16.5% of the total cost of the CIP. These projects are intended to reoccur every year, allowing the Town to continuously maintain detention basin functionality, selectively manage storm drain investigation and repair, repair deteriorating outfalls identified through the MS4 program or otherwise, and create and maintain a hydrologic and hydraulic model of the Town's storm drain system. A table depicting costs for each project described in the CIP is included in **Appendix G** of this Plan.

8.3.1 *Capital Fund Spending & Planning Strategies*

The Town must determine the best way to utilize available funds to maximize the total number of capital improvement projects addressed during the planning horizon. There are several strategies the Town may consider reducing capital expenditures; including consideration of trenchless rehabilitation alternatives where feasible, utilization of economy of scale for design and construction of infrastructure improvements (combining projects together), pursuit of state and federal grant and funding opportunities to supplement capital funding needs, and consideration of planned, non-stormwater related infrastructure or paving projects.

Trenchless rehabilitation was considered as a potential option for four culverts identified in the CIP based on the material, size, shape, location, and condition of the culvert. Trenchless rehabilitation would extend the useful life of the existing culvert by improving the structural integrity of the culvert without needing to fully replace the structure. Utilizing trenchless rehabilitation strategies to rehabilitate existing culverts would allow the Town to better allocate available funds and address more priority projects over the same planning horizon. The average cost to rehabilitate a culvert identified in this CIP is $70,000, or less than 10% of the average cost to replace a culvert but will not address flood capacity limitations or improve fisheries habitat. If the Town chooses to rehabilitate the four candidates for rehabilitation, the total cost for culvert projects may be reduced by $1,800,000, reducing the total percentage of the CIP funds allocated to culverts from 28.8% to 24.3% as shown in **Figure 8-2** below.

Figure 8-2: CIP Funding Needs Project Type Breakdown – Culvert Rehabilitation Strategy



The cost to design, permit, and construct several of the projects identified in the CIP at one time with one funding source may not be feasible. The Town may choose to divide or allocate the costs associated with each project over several years, first funding the planning or conceptual phase before moving into design and construction. The Town may choose to fund several projects to the shovel ready phase to then conduct a packaged procurement process by which multiple projects are combined together for construction, thereby reducing the overall CIP cost. Utilizing an economy of scale through a packaged procurement, could reduce the costs associated with construction document development, bidding and awarding, construction administration, and contractor materials, permitting, and mobilization and demobilization costs. Economy of scale could also be utilized on the detention basin rehabilitation and retrofit projects, storm drain rehabilitation projects, and hydrologic and hydraulic modeling efforts.

State and federal grant and funding opportunities may allow the Town to supplement available capital funds to complete various aspects of a capital improvement project. By pursuing grant and funding opportunities, the Town can reduce the overall Town generated funds needed to complete all of the projects included in the CIP. Grant and funding sources that can be considered by the Town include, but are not necessarily limited, to the following, as grants are continually changed and modified:

- Massachusetts Municipal Vulnerability Preparedness Action Grants (MVP)
- Massachusetts Department of Ecological Restoration Culvert Replacement Municipal Assistance Grant (DER)
- Massachusetts State Revolving Fund Loan Program (SRF)

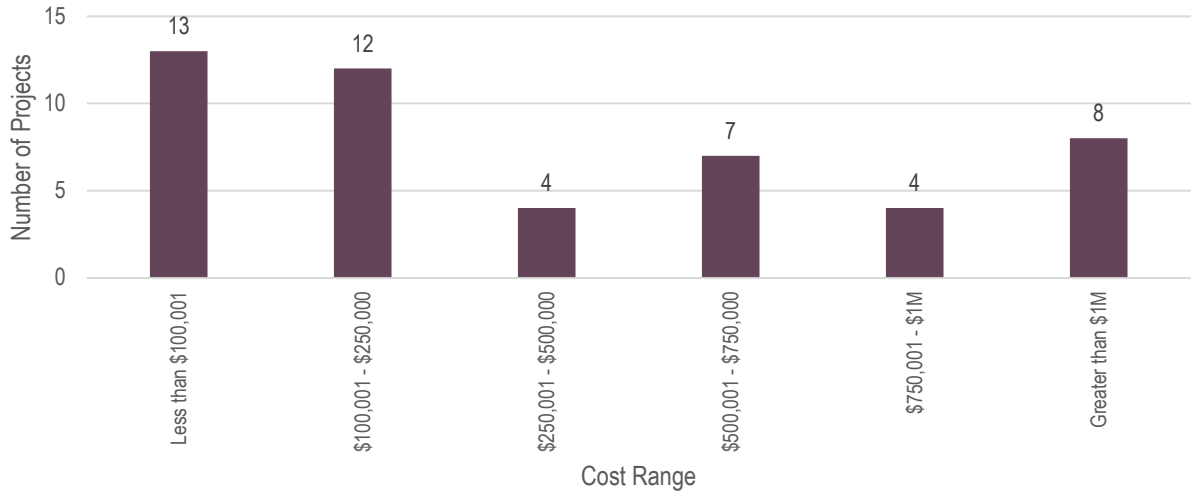
The Town may choose to re-prioritize projects within the CIP based on planned infrastructure or paving projects that are expected to occur during the CIP planning horizon. Planned sewer and water utility work within the Town should be cross referenced with the capital improvement projects, included herein, to identify if storm drain infrastructure could be replaced at the same time. By aligning stormwater capital improvement projects with town-owned utility upgrades, the Town will prevent duplicate construction efforts in the same location, thereby creating a cost savings. The Town's Pavement Management Plan, which identifies roads to be rehabilitated, reconstructed, or sealed within the next 5 years (2021 – 2025) should be considered when selecting capital improvement projects. By working with the Pavement Management Plan, the Town can ensure that a recently rehabilitated or reconstructed road is not damaged or reconstructed a second time as a result of an infrastructure improvement project, thereby creating a savings for the

Town. The following capital improvement projects are located in areas where pavement rehabilitation or reconstruction is planned over the next 5 years:

- 2022 – Memorial Park Drainage Rehabilitation Project
- 2023 – Belvedere Avenue/Brookline Avenue Drainage Study and Upgrades Project
- 2023 – Princeton Avenue Drainage Rehabilitation Project
- 2025 – James Street/Maynard Street Drainage Study Project
- 2025 – Fairview Street/Federal Street Extension Drainage Study and Upgrades Project

On an annual basis, the number of projects selected by the Town to design, permit, and construct will vary. As previously discussed, $500,000 annually should be allocated to reoccurring annual projects, leaving just over $1,500,000 in capital funds to be dispersed among all capital improvement projects, assuming the Town fully and equally funds the capital improvement projects annually. The Town may be able to address several capital improvement projects with lower estimated OPCs in a single year. A breakdown of projects within a cost range is provided in **Figure 8-3** below.

Figure 8-3: Opinion of Probable Cost Breakdown by Project Quantity



Note: 1. Does not include reoccurring annual allocation projects.

8.4 Summary of Capital Improvement Plan Recommendations

The capital improvement projects identified in this Plan result in a comprehensive CIP that can be utilized by the Town to effectively manage and improve their stormwater infrastructure. The total cost to address all capital improvement projects included in the CIP is $30,375,000 in 2021 dollars. This cost is subject to change as the capital improvement projects move into later stages of project development.

To begin addressing the capital improvement projects identified in the CIP, the Town must determine how funds will be distributed over the 10-year planning period. As described in **Section 8.3**, $500,000 annually should be allocated to reoccurring projects designed to allow the Town to continuously maintain and improve the stormwater infrastructure in Town. In addition to this annual allocation, Woodard & Curran recommends the Town allocate $200,000 per year for miscellaneous expenditures such as geotechnical evaluations, survey, wetlands delineation, grant and funding source

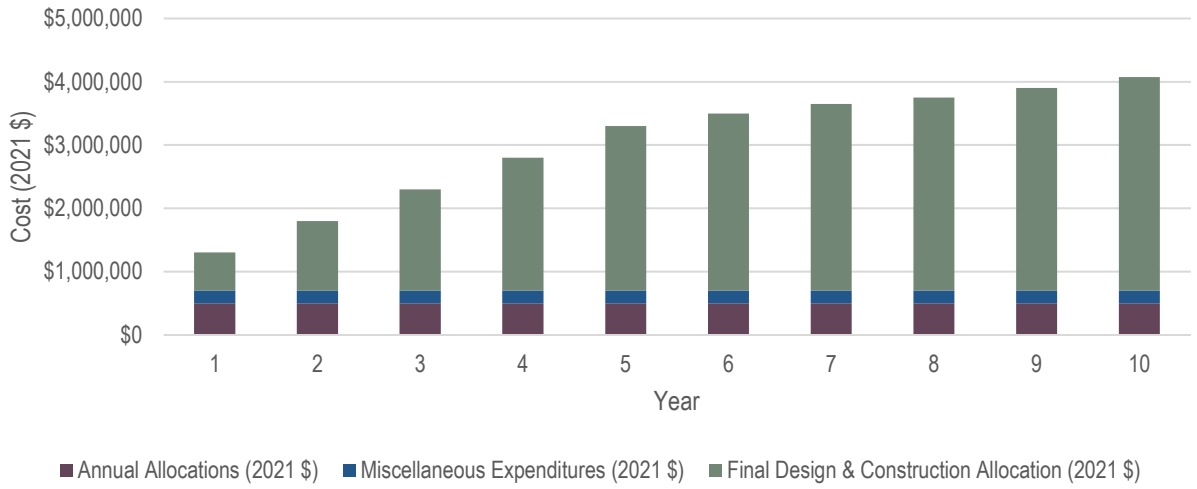
pursuit, infrastructure assessments, and updates to the CIP. The remaining funds should be allocated to final design and construction costs associated with each project.

Preliminary annual estimated capital funding needs are presented in **Table 8-2** and **Figure 8-4** below. Because the Town does not currently have many projects in the shovel ready stage, final costs associated with construction may not be realized until later into the planning period.

Table 8-2: Annual Estimated Capital Funding Needs

Year	Annual Allocations (2021 $)	Miscellaneous Expenditures (2021 $)	Final Design & Construction Allocation (2021 $)	Annual Estimated Funds (2021 $)
1	$500,000	$200,000	$600,000	$1,300,000
2	$500,000	$200,000	$1,100,000	$1,800,000
3	$500,000	$200,000	$1,600,000	$2,300,000
4	$500,000	$200,000	$2,100,000	$2,800,000
5	$500,000	$200,000	$2,600,000	$3,300,000
6	$500,000	$200,000	$2,800,000	$3,500,000
7	$500,000	$200,000	$2,950,000	$3,650,000
8	$500,000	$200,000	$3,050,000	$3,750,000
9	$500,000	$200,000	$3,200,000	$3,900,000
10	$500,000	$200,000	$3,375,000	$4,075,000
Total	**$5,000,000**	**$2,000,000**	**$23,375,000**	**$30,375,000**

Figure 8-4: Annual Estimated Capital Funding Needs



The CIP developed as part of this Master Plan should be considered a living document and be reevaluated annually to help determine capital funding needs. Projects not current identified in the CIP may be added at a later date depending on the Town's needs.

APPENDIX A: CLIMATE IMPACT ASSESSMENT

Climate Impact Assessment

Town of Agawam, Massachusetts

January 2021

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Andover, Massachusetts
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Introduction

The Town of Agawam (the Town) is located in Hampden County in southwestern Massachusetts along the Connecticut and Westfield Rivers (see **Figure 1**). The Town intends to develop a Stormwater Master Plan (Master Plan) to serve as the Town's Capital Improvement Plan (CIP) for storm drain infrastructure. The Master Plan will incorporate ongoing work related to the Town's Municipal Separate Storm Sewer System (MS4) Permit compliance program and align the CIP with compliance obligations and future water quality needs. Changes in precipitation intensity and frequency due to climate change are impacting the Town's drainage system, and these impacts are expected to be exacerbated in the future. To understand and mitigate these impacts, climate change will be considered in the development of the Master Plan.

This Climate Impact Assessment (Assessment) seeks to quantify the expected changes in precipitation intensity and frequency, identify vulnerable areas and infrastructure within the Town, and inform the prioritization of future drainage system improvements. The Assessment will consider critical facilities and infrastructure that are at greatest risk and would have the greatest impact if they fail. The Assessment will also incorporate information related to the changes in precipitation that are being reviewed by the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Advisory Committee. Additional climate stressors such as urban heat island effect and other potential impacts, such as those based on environmental justice will be discussed, using available state-wide and regional data.

Background

The Town of Agawam's focus on climate resilience and adaptation strategies is based on a string of extreme weather events and growing awareness of the vulnerability of drainage infrastructure to damages and a loss of capacity over time. As with most municipalities, the Town's drainage infrastructure has been constructed over time under varying design standards. The hydrologic and hydraulic analyses for the Federal Emergency Management Agency's (FEMA's) National Flood Insurance Program (NFIP) Special Flood Hazard Areas (SFHA's) within the Agawam area are dated March 1977. Development within the SFHAs are governed by the Town's Floodplain Zone Ordinance (Agawam, 2020b), which requires, among other things, that structures at risk be elevated or floodproofed above the Base Flood Elevation described in the Flood Insurance Study (FIS).

In recent years, the Town's existing stormwater drainage system has largely been mapped and added into the Town's Geographical Information System (GIS). The mapping shows locations of all catch basins, drainage manholes, pipes, outfalls, detention basins, and culverts. Design of this system is governed by the Town's Design Standards for Drainage (Agawam, 2020a) and has historically been based on a 1972 report Town staff indicate is no longer used (Tighe & Bond, 1972). The design capacity of the system is unclear, although the Town has historically used the 1961 Technical Paper 40 (TP40) to estimate runoff (Hershfield, 1961).

Agawam has learned to expect localized debris, erosion, and roadway flooding on at least an annual basis. Examples of recent disruptive weather events include "Snowtober" in October of 2011, which caused a town-wide power outage for up to 5 days, Hurricane Irene in August of 2011, which caused erosion on the Westfield River and failure of a 250-foot section of levee sheet pile, and extreme wind events in 2006, 2011, and 2013 (Agawam, 2020c). The Town's Hazard Mitigation Plan (Pioneer Valley Planning Commission [PVPC], 2016) identifies three major sources of flooding:

- Continental storms typically bring low-pressure from the west and occur throughout the year.
- Coastal storms, also known as nor'easters usually come from the south in late summer or early fall. Nor'easters may include occasional hurricanes, and typically generate very large amounts of rainfall.
- Thunderstorms typically form on warm, humid summer days, generating locally intense rainfall that may last several hours. These storms can form quickly and are difficult to predict.

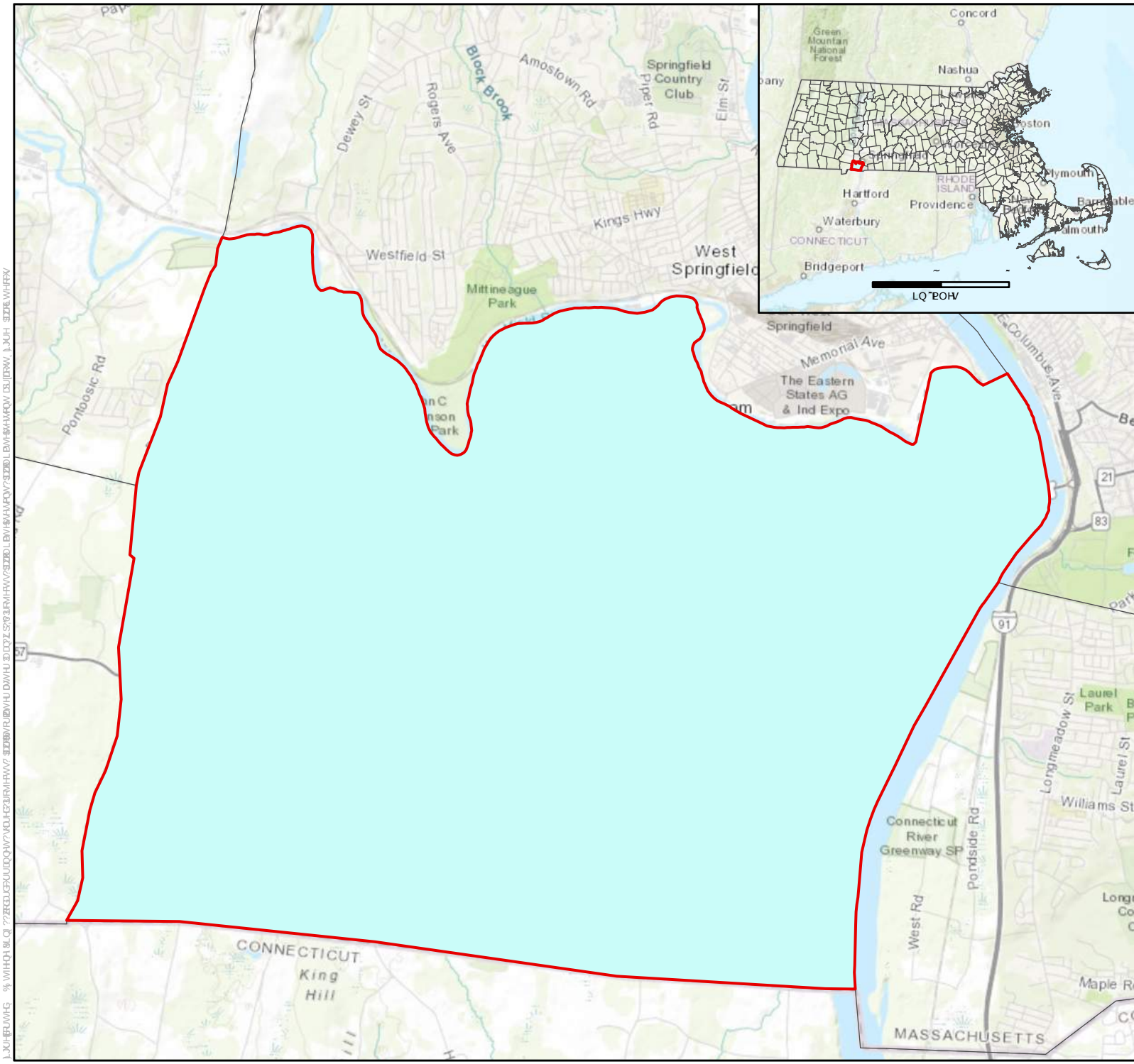

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Figure 2 presents FEMA's SFHAs within the Agawam area, as well as a history of Town and resident-reported local flood issues between August 2017 and December 2019[1]. Flooding issues were reported at 55 locations throughout the Town, the majority of which were not concentrated near or within the FEMA SFHAs. The majority of resident-reported flooding can be classified into three categories: (1) a blocked inlet causing street flooding, (2) a high stream or river water level, and (3) a septic failure from a rising ground water table. Rising groundwater tables can happen during flooding, as a result of increased infiltration, and are more likely in the future due to climate change, if areas are low-lying. These events can also occur if there is a failure of the drainage system (undersized, broken line, no line).

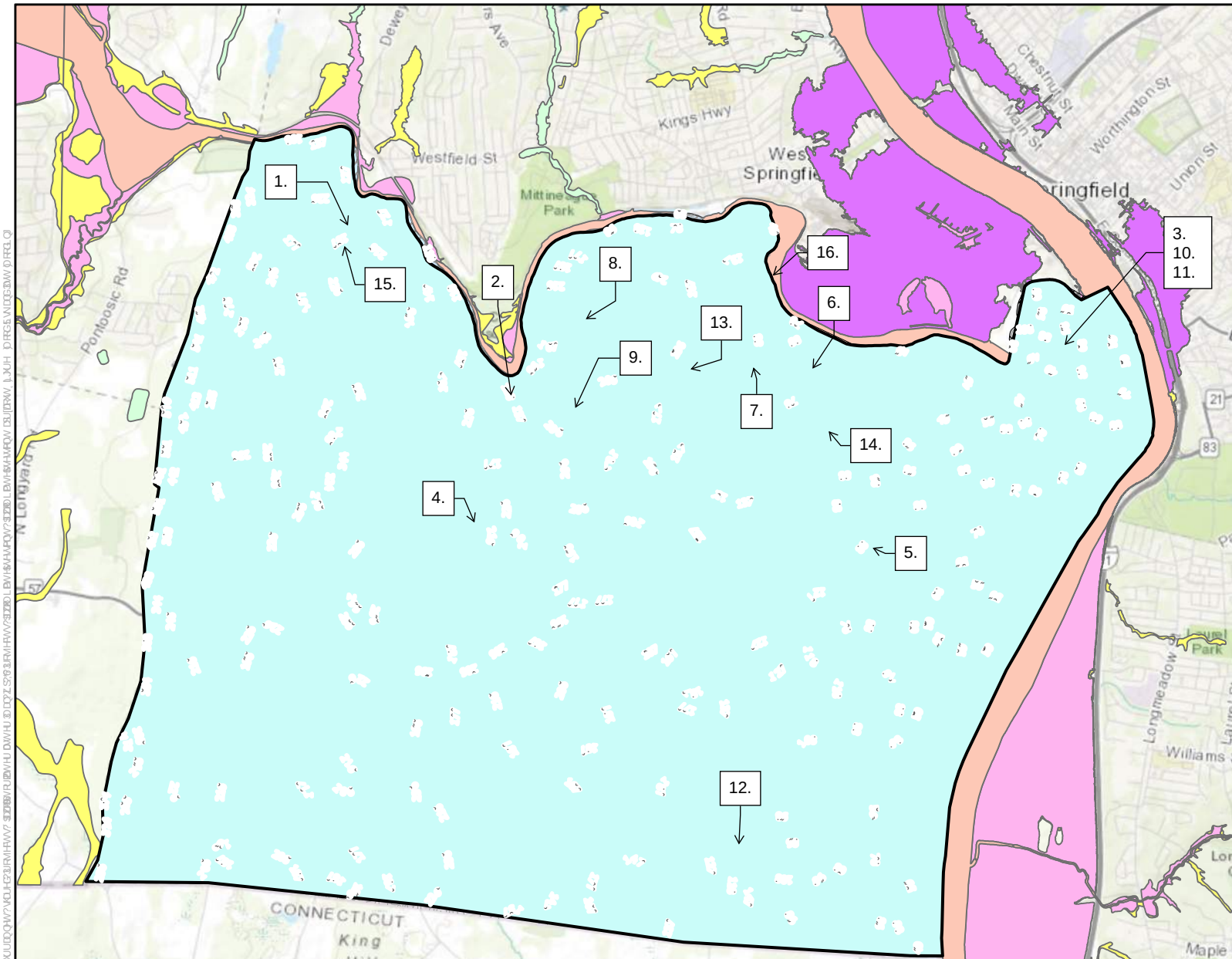
Agawam preliminarily identified a list of 16 known problem areas in the drainage system, where further investigations and system improvements have been prioritized. These areas were identified prior to beginning work on the ongoing Master Plan and will be reviewed and potentially reprioritized as part of the Master Plan. The 16 areas identified include:

1. May Hollow Culvert along North Westfield Street where the structural integrity of the concrete box culvert has been drastically reduced.
2. Deep Gutter Culvert along North Street where the culvert is undersized and damaged. The southern pipe invert is buried, and sections of the northern invert have been lost, causing backups during storms.
3. Meadow Street near Regency Apartments where surface drainage is poor, and many pipes have been damaged by tree roots and obsolescence.
4. Brookline Avenue and Belvedere Avenue, where surface drainage causes street and driveway flooding.
5. South Park Terrace, where existing dry wells have poor infiltration and catch basins near Main Street are connected to the sanitary sewer. The conditions have resulted in street and property flooding.
6. Fairview Street/Federal Street Extension where roots have impacted the drainage system and residents have reported flooding in the streets and driveways.
7. Ramah Circle where residents and businesses have reported flooding along the road and within their properties.
8. Liberty Street where dry wells may be under performing and residents have complained of flooding in the northern part of the street.
9. Hall Street where there is no existing positive drainage system and residents have complained of street flooding.
10. Ellison Avenue where residents have noted flooding on the southern side of the street, particularly in the winter, possibly due to a buildup of snow and/or debris that is preventing runoff from flowing.
11. A portion of James Avenue and a portion of Maynard Street from James Street to the State Pool where drainage infrastructure may be insufficient.
12. A location on Hunter's Greene where debris builds up in the swale and restricts flow during storm events.
13. Erosion of the embankment surrounding a concrete headwall of a storm drain outfall near 59 Rowley Street.
14. Deterioration of a reinforced concrete outfall pipe (TM-41-738) near 43 Westford Circle.
15. Deterioration of a stream bank due to an outfall between 87 and 95 Parkedge Drive.
16. Walnut Street where there are street flooding issues.

The resident-reported local flood events and other recent events in nearby communities have reinforced urgency for climate adaptation and compelled municipalities like Agawam to proactively plan and mitigate potential risks through a community driven process. Ultimately, the leadership demonstrated by Agawam's efforts will reduce the exposure and vulnerability of its citizens, infrastructure, and ecosystems. This work also contributes to the greater climate resilience of the entire Pioneer Valley region. Recognizing the importance of both mitigation and adaptation strategies to deal with the challenges of climate change, the Town of Agawam used the Municipal Vulnerability Preparedness (MVP) Planning grant as an opportunity to integrate these objectives into existing programs. In 2019, the Town successfully

[1] This data was gathered as part of a public engagement effort to evaluate stormwater funding needs in Agawam. An online interactive map was created for residents to access and report issues.

pursued and received funding from the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) to advance a Community Resilience Building workshop under the MVP program. The core directive of the MVP program is to engage community stakeholders to facilitate the education, planning, and ultimate implementation of priority climate change adaptation actions. Completion of the MVP process in 2020 enabled the Town to achieve MVP certified community status from EOEEA, which allows them to receive preference for future state grants.



Known Problem Areas and Drainage Issues:

1. North Westfield Street May Hollow Culvert - Deterioration
2. North Street Deep Gutter Culvert - Deterioration
3. Meadow Street Near Regency Apartments - Flooding
4. Brookline Avenue/Belvedere Avenue - Flooding
5. South Park Terrace - Flooding
6. Fairview Street / Federal Street Extension - Flooding
7. Ramah Circle - Flooding
8. Liberty Street - Flooding
9. Hall Street - Flooding
10. Ellison Avenue - Flooding
11. 52/54 James Avenue - Flooding
12. 4 Hunter's Greene - Flooding
13. 59/61 Rowley Street - Deterioration
14. 43 Westford Circle - Deterioration
15. 87/95 Parkedge Drive - Deterioration
16. Walnut Street Extension - Flooding

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This Assessment provides an overview of the top hazards, current concerns and challenges, strengths, and proposed actions to improve the Town of Agawam's resilience to natural and climate-related hazards today and in the future. This Assessment also incorporates information related to the changes in precipitation that are being reviewed by the MassDEP Stormwater Advisory Committee. This includes the ongoing effort to update the MassDEP Stormwater Handbook to use of the 2015 National Oceanic and Atmospheric Administration Atlas 14 Volume 10 Version 3.0 (NOAA14) data versus the 1961 TP40 data that is the basis of the current design standards.

Climate Change

Climate change is impacting communities around the world. Residents of Agawam and elsewhere in the Connecticut River Basin see these changes and their impacts almost every day. New climate projections from the Northeast Climate Science Center at the University of Massachusetts show with more certainty than ever that these changes can be expected to continue. Projections are based on simulations from the latest generation of climate models from the International Panel on Climate Change and scenarios of future greenhouse gas (GHG) emissions and are downscaled to the watershed county level across the Commonwealth of Massachusetts.

Climate History and Trends

Agawam lies primarily in the Connecticut River Basin within Hampden County, where projections show that by the end of this century, communities could see more than 7 inches of additional rainfall per year over a 1971-2000 baseline of 46.4 inches per year. The winter season is expected to experience the greatest seasonal increase both in total precipitation and frequency of heavy downpours, or days receiving precipitation over one inch. Projections also suggest that summers may be drier and there will be an increase in series of days without any rain at all. Historic and projected precipitation trends for Hampden County, MA are presented in **Figure 3**.

With regards to temperatures, projections show that annual average and maximum temperatures will continue to rise. Temperatures increase and decrease over time, but the data indicate that the overall trend will result in increased temperatures in the future. Even a very small rise in average temperatures can cause major changes in other factors, including impacts on species and ecosystem health and the relative proportion of precipitation that falls as rain or snow. Beyond this general warming trend, the change that may impact Agawam and neighboring communities the most is the increase in very hot days. Projections from the Northeast Climate Science Center indicate a 300% (30-day) increase in 90-degree days/year on average by the end of the century from a baseline average of 6 days per year. Generally, extreme heat is considered to be over 90 °F, because at temperatures above that threshold, heat-related illnesses and mortality show a marked increase. Heat waves can lead to illness and death, particularly among individuals with existing health risk factors. Historic and projected temperature trends for Hampden County, Massachusetts are presented in **Figure 4**.

Finally, projections indicate an increase in the frequency and magnitude of extreme weather. This could come in the form of tropical storms, or other high intensity wind and rain events. Here, too, the greatest changes will occur in the spring and winter.

Figure 3: Historic and Projected Precipitation Trends in Hampden County (Resilient MA, 2020)

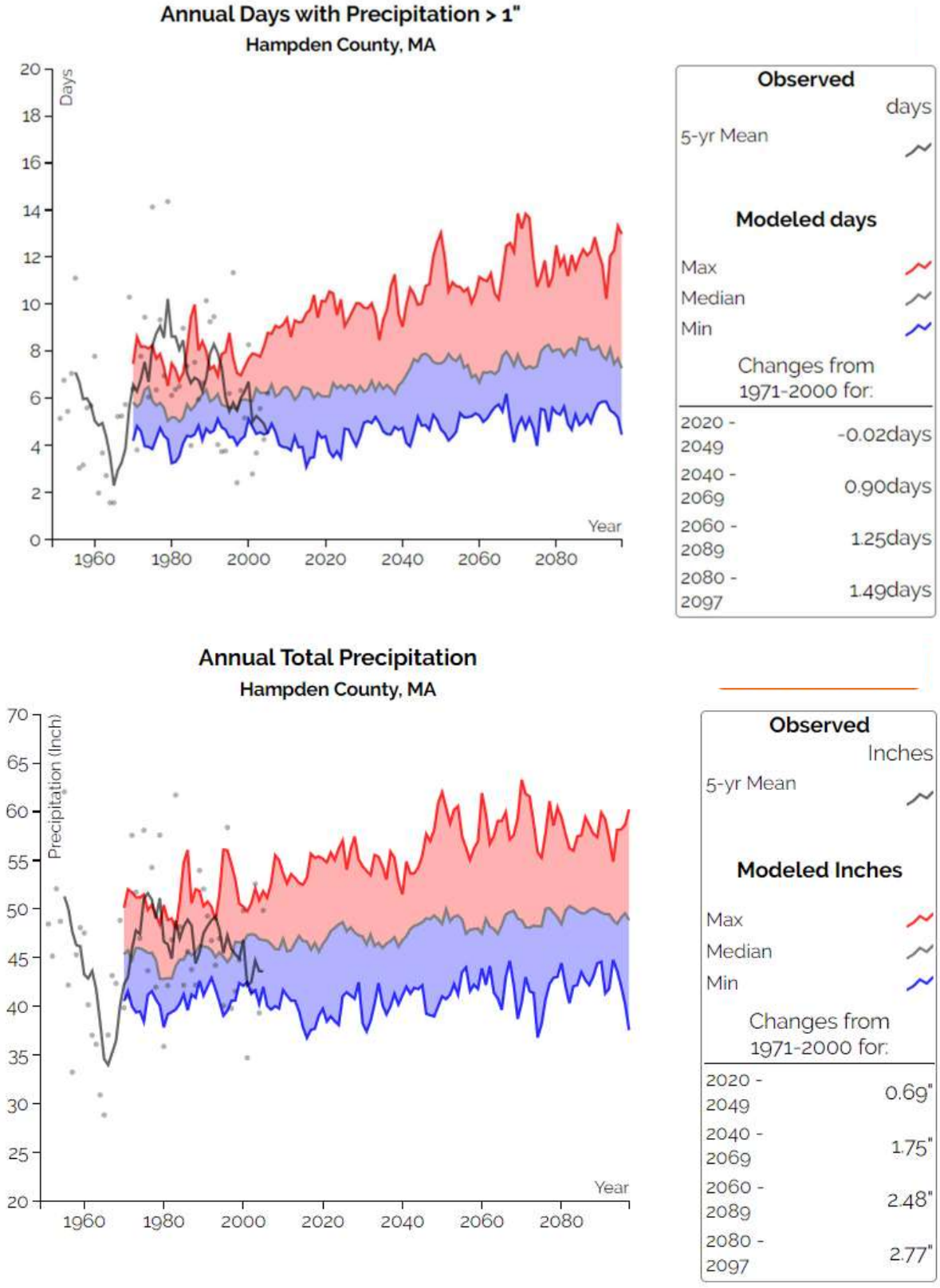
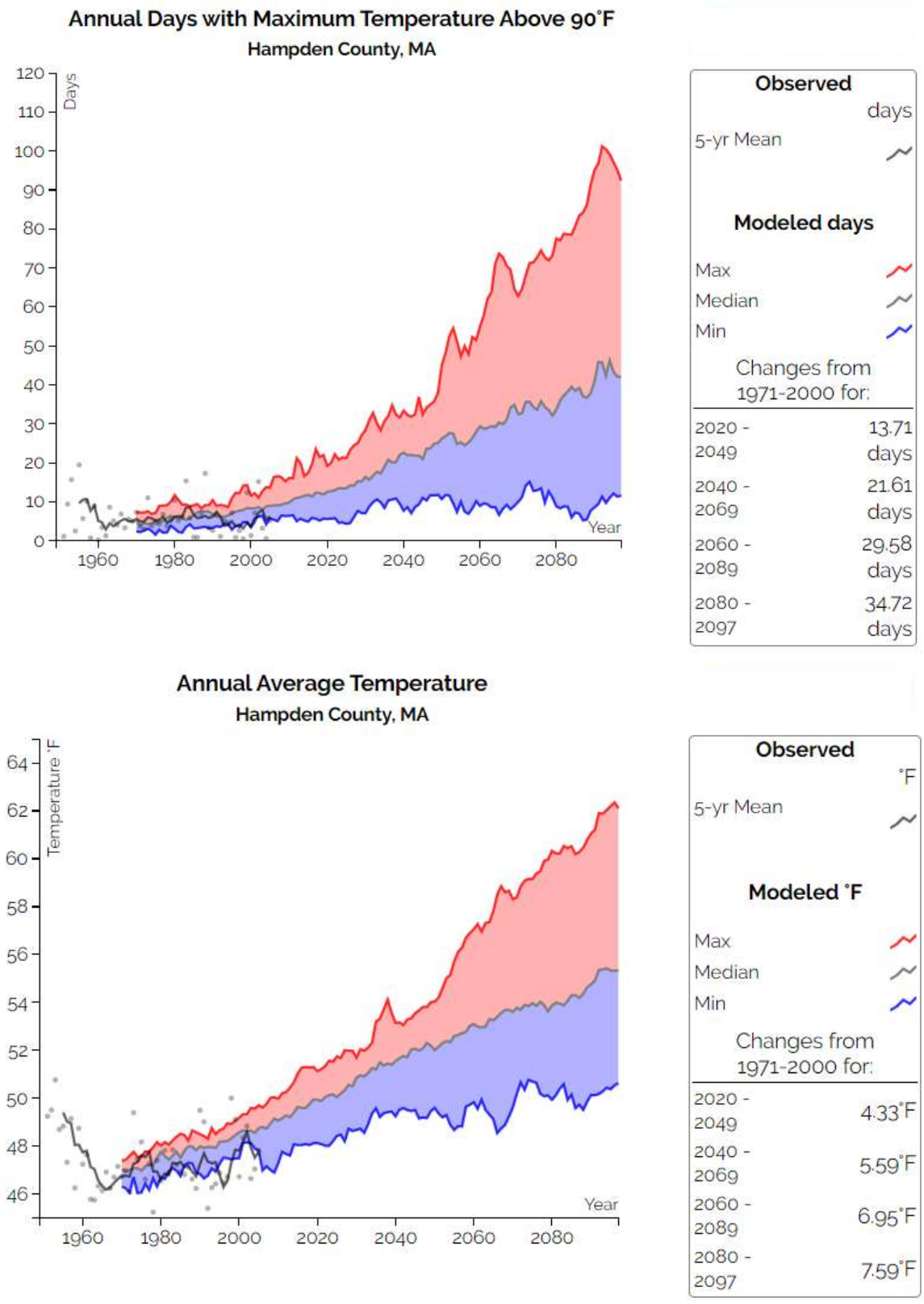


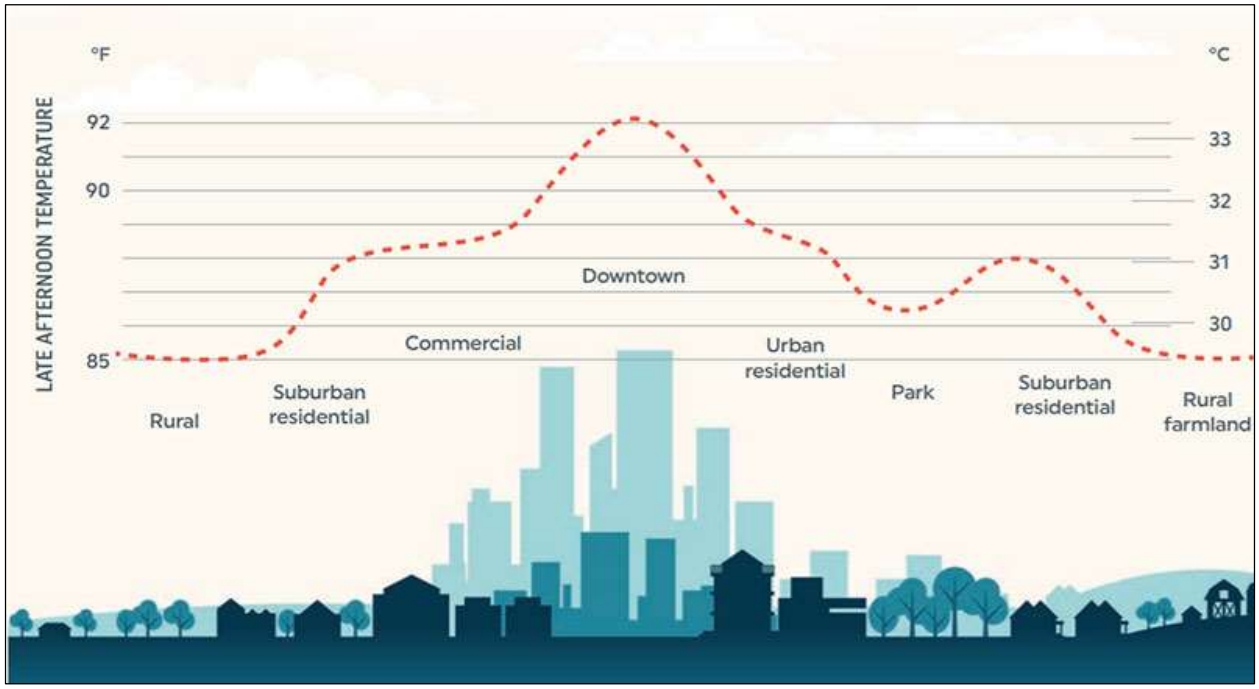
Figure 4: Historic and Projected Temperature Trends in Hampden County (Resilient MA, 2020)



Heat Islands and Tree Cover

An urban heat island (UHI) occurs when an urbanized (largely impervious) area experiences much warmer temperatures than outlying areas. Impervious structures such as buildings, roads, and other infrastructure absorb and re-emit the sun's heat more than natural, vegetated landscapes and water bodies. Urban areas, where impervious structures are highly concentrated and vegetation is limited, become "islands" of higher temperatures relative to outlying areas. **Figure 5** presents a typical urban heat island profile.

Figure 5: Urban Heat Island Profile (Urban Land Institute, 2020)

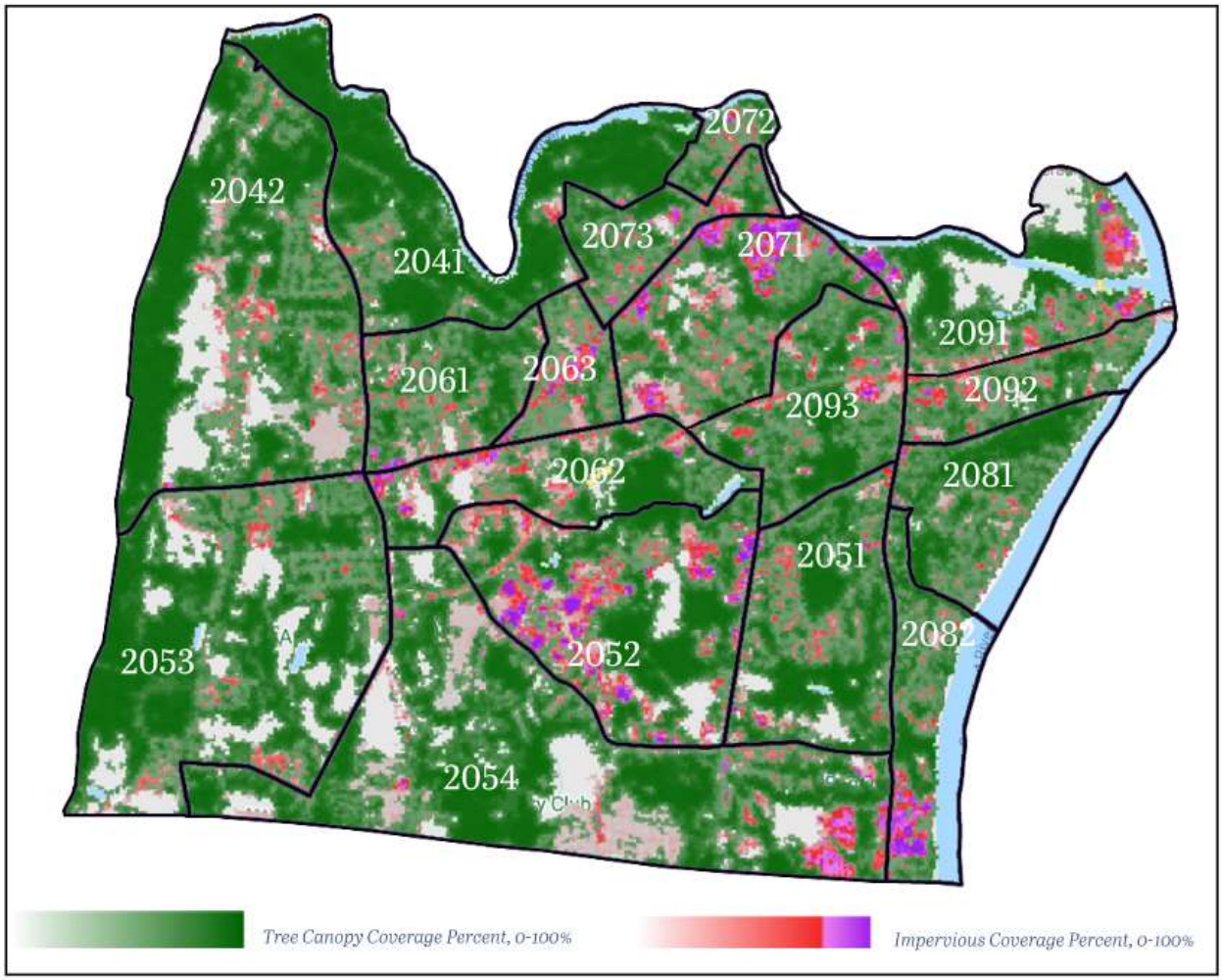


Agawam's residential and commercial centers in town are largely impervious and lack tree cover and other vegetation, which makes them more vulnerable to UHI effect as a result of rising temperatures caused by climate change. In addition, climate change has been shown to impact the health of urban trees due to an increasing population of invasive insects, such as the emerald ash borer and the hemlock woolly adelgid. As well as reducing GHG, which helps slow future climate change, vegetation helps slow and reduce runoff in urban areas through interception and uptake.

The Town is assessing the benefits of increasing canopy cover as one of its climate adaptation strategies. The Pioneer Valley Planning Commission (PVPC) prepared a preliminary study for the Town (PVPC, 2020) that investigates the existing urban canopy across the town's neighborhoods using aerial imagery and provides an economic valuation of the air quality, stormwater management, and carbon sequestration and storage benefits that canopy provides. The study found that canopy cover varies significantly across town as shown in **Figure 6**. For example, census block group (CBG) 2063 in Central Agawam had the lowest percent of its land area in canopy cover at 20.5% and the highest percentage in impervious cover at 42.8% while CBG 2041 in North Agawam had the highest percent of its land area in canopy cover at 67.4% with only 6.1% impervious cover. The study also found that more disadvantaged neighborhoods with higher rates of poverty and more minority residents tend to have less canopy cover. For example, CGB 2091, a state-designated Environmental Justice population, was found to have a relatively high impervious area and low canopy. In conjunction with increasing tree canopy, impervious areas can be mitigated by removing it through redevelopment projects. Prioritizing impervious areas for increased canopy cover by adding trees and vegetation will yield the largest economic and environmental benefits for the Town. The Master Plan includes an impervious area

mitigation strategy that will consider existing tree canopy and opportunities to mitigate impervious areas to reduce UHI and improve stormwater management (quantity and quality).

Figure 6: Agawam Tree Canopy and Impervious Cover (PVPC, 2020)



Precipitation and Frequency Impacts

NOAA14+ is the preferred method that MassDEP intends to adopt to determine rainfall intensity because it incorporates more risk and better accounts for larger observed storms. NOAA14+ is calculated by multiplying the Upper Confidence limit of the NOAA14 precipitation frequency estimates by 0.90. Differences in rainfall frequency and intensity between the NOAA14+ and TP40 data are shown for Agawam in **Table 1** below. The NOAA14+ rainfall intensity is greater than that of TP40 by approximately 27%, 42%, and 59% for a 10-year, 25-year, and 100-year event, respectively.

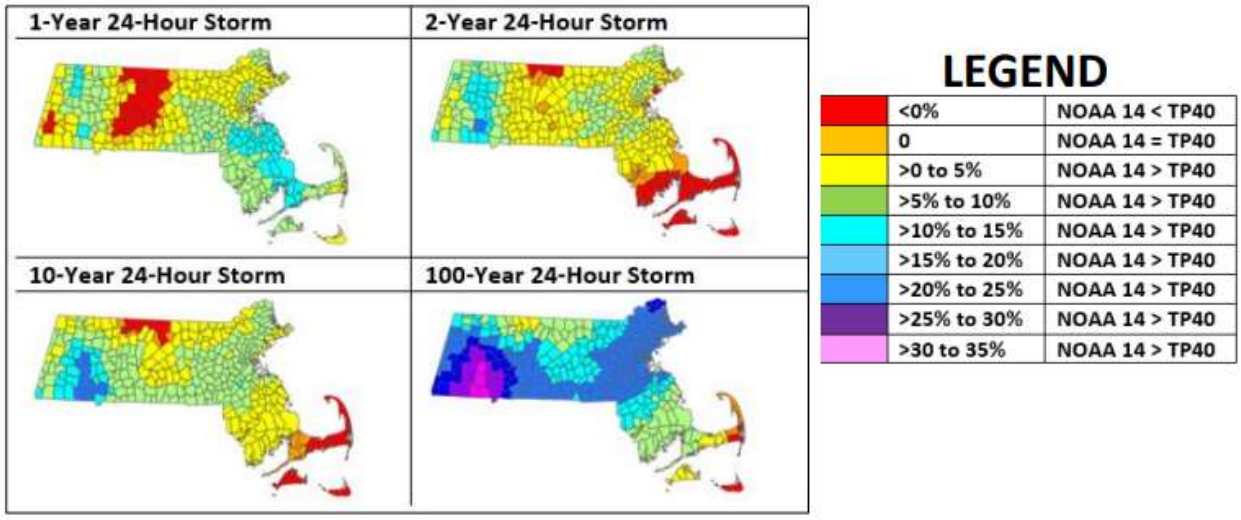
Table 1: Precipitation Data – TP40 vs. NOAA14+

Rainfall Event (return period, present day)[1]	TP40	NOAA14+	NOAA14+ Minus TP40	
	inches	inches	inches	%
10-year	4.5	5.73	1.23	27
25-year	5.3	7.55	2.25	42
50-year	6.0	8.86	2.86	48
100-year	6.7	10.62	3.92	59

[1] 24-hour storm duration

Differences in rainfall intensity estimates between NOAA14+ and TP40 are greater for larger, less frequent storms. As shown in **Figure 7**, the NOAA14 estimates in Massachusetts are up to 35% higher than TP40 estimates for 100-year events in Hampden County; however, for 1-year events, NOAA14 estimates are only up to 15% higher than TP40. Part of this difference can be attributed to extreme precipitation events becoming more frequent, a trend that is expected to continue. For example, a storm that was previously considered a 100-year event when TP40 was published 1961 is now equivalent to a more frequent event. Note that the TP40 50-year and 100-year storm events in **Table 2** are equivalent in intensity to 42-year and 83-year storm events, respectively.

Figure 7: Precipitation Data – TP40 vs. NOAA14 (MassDEP, 2020)



Values for precipitation from the NOAA14+ estimates in **Table 2** only incorporate risk observed in the current data to reflect the range of larger storms. They do not account for expected changes to precipitation intensity and frequency due to climate change projections. Therefore, the NOAA14+ estimates presented in **Table 2** were adjusted using the Draft Tiered Methodology for Extreme Precipitation Depth and Intensity (Tier 2), which was developed by the Resilient MA Action Team (RMAT) and is described in Section 3 of their "Draft Climate Resilience Design Standards & Guidelines" (RMAT, 2020).

Table 2: Precipitation Data – NOAA14+ Adjusted for Climate Change

Rainfall Event (return period, present day)	NOAA14+ Baseline (inches)	30-year Planning Period (2050)		50-year Planning Period (2070)	
		% increase[1]	inches[2]	% increase[1]	inches[2]
10-year	5.73	13%	6.47	22%	6.99
25-year	7.55		8.53		9.21
100-year	10.62		12.00		12.96

[1] Percent increase applied to NOAA14+ baseline values for each 24-hr design storm depth in accordance with RMAT Tier 2 Methodology: 13% for Mid-Century Planning Horizon (2030, 2050) and 22% for Late-Century Planning Horizon (2070, 2100).

Extreme precipitation as rainfall tends to occur in New England during the spring through fall. However, historical events can only provide so much insight. When considering recent large (in size if not traditional class rating) hurricanes, such as Harvey and Florence, which poured approximately 60 inches and 24 inches of rain on parts of Texas and South Carolina, respectively, and the general warming trends in the ocean and atmosphere in New England, which will tend to produce heavier precipitation in general and lead to more rainfall constituting a greater portion of precipitation during

winter storms, the potential for a nor'easter or hurricane to produce extreme rainfall should not be ignored. It will be prudent to continue to consider flood risk from extreme precipitation to properly understand risk and how individual protection components, like collection systems, culverts, pump stations, and berms/levees must be designed to provide complementary protection.

Impacts of River Backwater

Agawam is situated adjacent to the Connecticut River and the Westfield River (a Connecticut River tributary) along its eastern and northern borders, respectively. Riverine flooding occurs when a river overflows its banks and water spills out onto the floodplain. Riverine flooding is typically caused by heavy rain and can be exacerbated in combination with snowmelt or river ice jams. Rising water surface elevations in the rivers receiving the Town's drainage can also reduce the capacity of outfall pipes' ability to discharge, as they become inundated and thus cause drainage problems farther upstream. Finally, rising water levels in rivers and streams can create a rise in groundwater tables that can create or exacerbate flooding in low-lying areas.

To quantify the impact of extreme precipitation on riverine flooding, peak streamflow data from USGS (USGS, 2020) were reviewed at the two stations closest to Agawam along the Westfield River (Station Number 01183500) and Connecticut River (Station Number 01184000). At the Westfield River station, the highest peak streamflow recorded since 2010 was 26,200 cfs recorded in August of 2011 where the water surface reached an elevation of 117.4 feet NAVD88 (or 19.92 feet above the gage). At the Connecticut River station, the highest peak streamflow recorded since 2010 was 128,000 cfs in August of 2011 where the water surface reached an elevation of 45.6 ft NAVD88 (or 17.82 feet above the gage). Note that peak discharge at both of these stations is affected by flow regulation at upstream dams. Annual average discharge recorded at the Westfield River and Connecticut River stations from 2011 through 2019 were 1,031 cfs and 18,859 cfs, respectively. Additionally, gage height data were available at the Connecticut River station and from 2011 through 2019 and the average annual gage height was 9.64 feet, which is equivalent to a water surface elevation of approximately 37.7 feet.

The August 2011 peak flow event recorded a water surface elevation of nearly 8 feet above the annual average. Therefore, extreme precipitation events have the potential to significantly increase river discharge, resulting in higher water surface elevations with the potential to overtop banks and cause significant flooding. Low-lying areas of Agawam and stormwater infrastructure adjacent to riverways could be especially vulnerable to flooding from river backwater since the Town is bordered by the Westfield River to the north and the Connecticut River to the west.

Environmental Justice Impacts

As with many Western Massachusetts communities, Agawam has an aging population with approximately 21% of residents aged 65 and over. Seniors may be more at risk for health issues related to extreme heat and cold and seniors may also be more isolated if they are living alone. Other potentially isolated populations include non-English speaking residents, who may be disengaged or less involved with municipal affairs, and any residents who are otherwise unable to engage regularly with town programming or communications. Nearly 15% of Agawam's residents speak a language other than English at home, primarily an Indo-European or Spanish language, and 26% of that population reports speaking English "less than well." There is also a lack of education and communication around the risks and impacts of climate change amongst the student population. The Town's current student curriculum does not include education around climate change, which may lead to student uncertainty around the future and what they can do to help their town make progress in adaptation efforts.

One particular area of concern is the Environmental Justice (EJ) by Income community located in the northeast of town; a neighborhood MassGIS delineated based upon 2010 Census Data (annual median household income equal to or less than 65% of the statewide median, $62,072 in 2010) where residents of low-to-moderate income are concentrated. EJ populations are more likely to live in risk-prone areas with poor or insufficient infrastructure and are

more likely to seek emergency services during severe weather events. Approximately 6% of the Town's total land area and 4.3% of its total population falls within the roughly 1.5 square-mile EJ community shown in **Figure 2**, which is bounded by Highway 57 to the south, Main Street to the west, the Town of West Springfield to the north, and the Connecticut River and the City of Springfield to the east.

Although the Town has no record of resident-reported flooding within the EJ by Income area between 2017-2019, the community is situated between two FEMA-designated regulatory floodways (the Connecticut River and the Westfield River) and is most likely to flood already during extreme precipitation events. More than half of the community is also located within a FEMA 100-year flood hazard zone. It is possible that this community was unaware of the online interactive map to report flooding issues, do not have access to a computer, or did not understand the map due to a language barrier.

Infrastructure at Risk

Stormwater Infrastructure

Much of the Town's stormwater infrastructure was designed in accordance with the 1961 TP40 guidance that has been superseded by newer NOAA14 data. Any underperformance of the drainage system due to climate change will have knock-on effects on other infrastructure within the Town, including the Town's water supplies, wastewater collection system, pump stations, roadways and bridges, and general access to critical routes or facilities. Increased precipitation also creates concern about changing chemical reactions in water and wastewater treatment and increasing pressure on aging reservoirs, among other issues.

Until recently, the Town's subdivision ordinance was worded such that detention basis are owned by individual homeowners, not by the association, and as a result, these facilities often go unmaintained. The Town is considering funding the restoration of existing detention basins, then either taking on maintenance and repair of the basins within subdivisions or increasing enforcement of maintenance requirements including mowing to keep them functional. The Town's stormwater infrastructure, including outfalls, detention basins, and pipes are shown in **Figure 8**.

Levees and Dams

According to the Department of Conservation and Recreation (DCR)'s Office of Dam Safety (ODS), there are 11 known dams in Agawam, one of which is ranked as a significant hazard and one of which is ranked as a high hazard. High hazard dams are classified as likely to cause loss of life and serious damage to public and/or private infrastructure should a dam failure occur while significant hazard dams may cause loss of life and damage to property and infrastructure. While Provin Mountain Reservoir Dam, the high hazard dam, is located within Agawam, it is owned and operated by the Springfield Water and Sewer Commission. At its most recent inspection, Provin Mountain Dam was rated in satisfactory condition. The significant hazard dam, Silver Lake Dam, is owned by the Silver Lake Corporation in Agawam and was rated satisfactory as well. Of the remaining five regulated dams, four were rated as being in less than satisfactory condition.

A 250-foot section of levee along the Westfield River was impaired during the high waters of Hurricane Irene (2011), illustrating the risk of more extreme weather events on the levees and floodwalls protecting the low-lying areas of the Town. In addition to the potential for damages to flood protection structures, streambank erosion can expose critical infrastructure running along the banks of rivers and streams.

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Recommendations

Based on the data available, it is critical that the Town continues to further its work to address the current and future impacts of climate change in the planning, design, and construction of infrastructure. The recommendations of this Assessment comprise both near-term recommendations that impact the Town's stormwater planning efforts underway, and long-term recommendations that should be considered to increase the Town's overall drainage and flood control resiliency in the face of climate change. The near-term and long-term recommendations are detailed below.

Near-term Recommendations

Principal among the recommendations of this Assessment is the need to incorporate future climate conditions into the Town's planning, design, and construction efforts, including the current stormwater master planning effort. At a minimum, for consistency with MassDEP guidance, the NOAA 14+ baseline projections for precipitation presented in **Table 1** should be used in the Town's stormwater design standards. However, it is also recommended that the Town consider using the Draft Tiered Methodology for Extreme Precipitation Depth and Intensity (Tier 2), which was developed by the Resilient MA Action Team (RMAT), to quantify expected changes to precipitation intensity and frequency over the next 50 years due to climate change projections. Note that a 50-year planning horizon is generally consistent with infrastructure design life. The NOAA14+ baseline and future precipitation values are shown for various return periods and planning horizons in **Table 2**.

To facilitate consistent implementation of the new design standard, it is recommended that the Town review and update the Town Code. The Design Standards for Drainage (Agawam, 2020a) article of the Town Code should be updated to reference NOAA 14+ baseline and/or future precipitation projections, minimum pipe size, freeboard, and green infrastructure requirements. It is also recommended that the Town update the Floodplain Zone article of the Town Code (Agawam, 2020b) to reflect updates made to the Design Standards for Drainage article of the Town Code and the updated Massachusetts Model Floodplain Bylaw and consider requiring protection of new and substantially improved structures 1-2 feet above the Base Flood Elevation to reduce flood risk. Stormwater management and illicit discharge, erosion and sediment control, planning and zoning requirements should be better integrated or cross-referenced with drainage design portions of the Code.

Culvert Condition Assessment Recommendations

All of Agawam's drainage outfalls were inspected as part of a culvert condition assessment completed in 2020. **Figure 8** shows the outfalls that were identified as damaged as part of the condition assessment effort. Damaged outfalls can cause blockages that reduce system capacity. It will be critical to the performance of the Town's drainage system to repair damaged outfalls. In determining the priority of these repairs, the Town should seek to address those that may contribute to reducing the impact of past performance issues, as noted in **Figure 2Error! Reference source not found.**. The Town may also wish to add weight to ranking those identified in areas more heavily impacted by environmental justice concerns and in low-lying areas within or adjacent to floodplains, as shown on **Figure 2**. Prioritization would benefit from additional analyses of system performance based on expected future runoff rates, as discussed under Long-Term Recommendations, below.

Storm Drain Infrastructure Assessment Recommendations

Efforts are currently underway to evaluate the condition of the current system in priority areas, or areas where condition is unknown and the consequence of failure is high, as part of the ongoing Master Plan. The connection to modeling makes sense either way and would be the next step beyond the projects identified in this project. For new or replacement drainage infrastructure, consideration should be given to sizing these to handle future flows under climate change projections. Design criteria should be determined, clearly articulated for a range of infrastructure types, and enforced. In determining the desired design criteria, the Town should consider undertaking a hydrologic and hydraulic modeling effort, as outlined under Long-Term Recommendations, below, to better understand the potential implications

of a design criteria update. Without a long-term comprehensive plan, local improvements can cause unintended consequences to adjacent areas. As improvements are implemented in the near-term, individual hydraulic studies should be performed to verify current system performance is not negatively impacted.

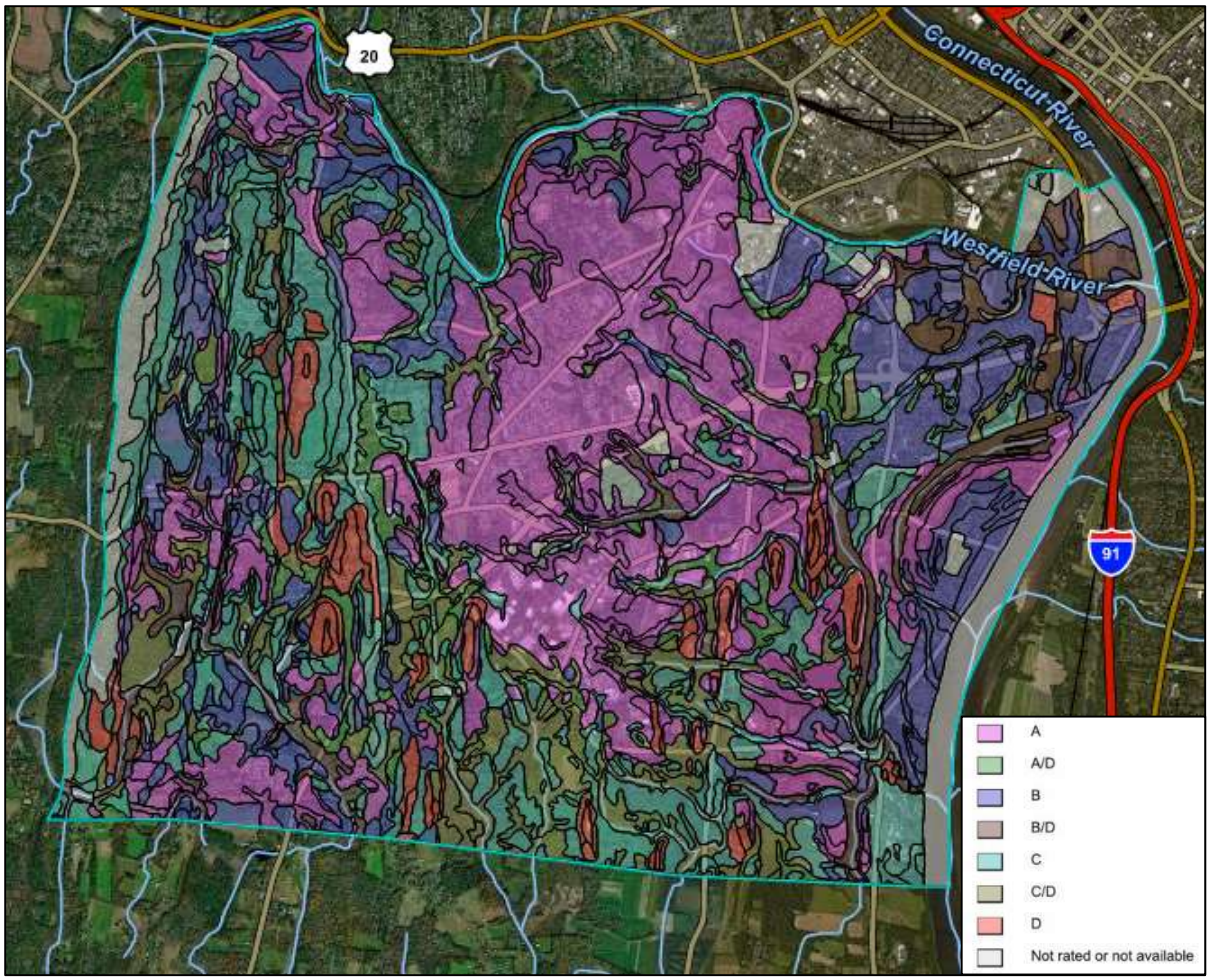
Detention Basin Retrofit Survey Recommendations

The Town should also consider opportunities to retrofit existing detention basin locations to increase storage, either by increasing the above-ground storage, or implementing infiltration galleries below areas in active use. These locations could be leveraged to introduce multi-benefit projects to enhance the Town's open spaces, tree cover, and to address water quality and EJ concerns. Storage can also be achieved through nature-based solutions such as floodplain restoration or reconnection. "nature based " storage also includes reducing IA overall.

Storm Attenuation Recommendations

Agawam could consider and evaluate the feasibility and impact of adding storage, such as detention basins, to higher elevation areas throughout the Town within the upper portions of the watershed to capture and infiltrate runoff. Soils throughout much of the Town are classified as Hydrologic Soil Groups A and B, which are the best soils for storage basins because of their high infiltration rates and low runoff potential. The Town should avoid placing storage in areas classified as Hydrologic Soil Groups C and D because these soils have slower infiltration rates and higher runoff potential. When planning for additional detention, the Town should conduct site-specific soil borings to verify infiltration potential prior to implementation. Hydrologic Soil Groups are shown on **Figure 9**.

Figure 9: Hydrologic Soil Groups (USDA, 2020)



The Town should also consider identifying systemic green infrastructure opportunities through updates to its Code, as noted above, and initiation of a green streets initiative, as noted under Long-Term Recommendations, below. The Town may need to consider stormwater pump stations in low-lying areas with inadequate drainage as part of an alternatives analysis. Before implementing additional drainage, the Town should consider system-wide modeling to better understand whether localized improvements could be sufficient to handle drainage needs.

CIP Recommendations

In the near-term, the capital improvement planning efforts should focus around addressing the known flooding issues identified by the Town and its residents, as described in **Figure 2** and as identified in the Master Plan. However, as repairs are designed and implemented, it is recommended that the Town use future conditions runoff, as discussed above in **Table 2** to size drainage system components and implement a minimum pipe diameter of 12-inches.

Other Recommendations

Agawam should consider an update to its floodplain management ordinance to reflect the Town's updated understanding of its flood risk due to climate change. The Town could adopt a requirement for increased elevations for all structures and increased freeboard for non-residential floodproofing. Such measures may have an added benefit of reducing flood insurance premiums for policy-holders, if the Town elects to apply for participation in FEMA's Community Rating System. Agawam should also consider expanding the applicability of its floodplain management activities to the 500-year SFHA.

Long-term Recommendations

Further Analyses

To help the Town develop a systematic approach to identify system constrictions and leverage upgrades to address current and future impacts from climate change, the Town should develop a hydrologic and hydraulic model of its drainage system. Based on updated rainfall estimates, land use, and imperviousness, such a model would determine the runoff from each of the Town's subwatersheds and route it through the system to identify current conveyance deficiencies. A subsequent step would be to analyze volume and timing of peak flows in the rivers and to model system performance under a future climate change scenario, with the higher tailwater in the rivers. This modeling effort would allow the Town to understand what has the potential to be at risk in the future. The Town could consider evaluating the potential for real-time flood control in conjunction with future hydraulic studies.

Planning and Design Considerations

The Town should leverage the results of hydrologic modeling to inform development of design guidance (design storm, methods, sizing, conveyance, freeboard) for new and replacement drainage infrastructure and integrate this guidance with water quality and other design criteria. Consider reflecting the additional needs of EJ areas of the Town and reducing imperviousness/increasing tree cover overall through multi-benefit project requirements such as green streets and other green infrastructure projects. Implementation of a green streets initiative could identify opportunities to intercept runoff as other planned infrastructure improvements move forward.

The Town may wish to update its Hazard Mitigation Plan (PVPC, 2016) and the Pioneer Valley Climate Action and Clean Energy Plan (PVPC, 2014) to reflect a need for additional detention and drainage capacity to adapt to climate change and reduce flood hazard. With understanding of climate change projections rapidly improving, more frequent updates to these planning documents may be warranted.

Conclusions

The Town of Agawam has laid extensive groundwork for climate change adaptation, performing community outreach and collecting information on the existing conditions of its drainage infrastructure. This work continues with the Stormwater Master Planning work currently underway. Climate adaptation measures should continue to be integrated

into both near-term and long-term planning and design efforts and long-term climate change predictions should be revisited periodically, as knowledge of climate change advances.

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APPENDIX B: CULVERT ASSESSMENT MAPS & TABLES

Agawam Culvert Survey123 Inspection Form

Agawam Culvert Inspection

Culvert ID
CLV-155

Ownership
Municipal

Inspection Date
Thursday, January 21, 2021

Inspection Point
42°4'N 72°37'W



Street Name(s)

Inspector
- Town
- Consultant

Culvert Type
- Bottomless Box Culvert
- Box Culvert
- Pipe Arch
- Pipe Culvert
- Open Bottom Arch
- N/A: Bridge
- Other

Culvert Material
- Coated Corrugated Metal Pipe
- Corrugated Metal Pipe
- Ductile Iron
- HDPE
- PVC
- Reinforced Concrete Pipe
- Steel
- Stone/Granite
- Other

Width (inches)

Height (inches)

Road Fill Height (feet)

Observed Condition
- Very Poor
- Poor
- Fair
- Good
- Very Good

Upstream Headwall Material
- Concrete
- Granite
- Stone
- N/A
- Other

Downstream Headwall Material
- Concrete
- Granite
- Stone
- N/A
- Other

Culvert Observation
- [ ] Conduit deterioration
- [ ] Conduit cracking
- [ ] Conduit submerged
- [ ] Cross section deformation
- [ ] Poor headwall condition
- [ ] Poor joint/seam condition
- [ ] Sediment/Vegetation removal needed

Comments

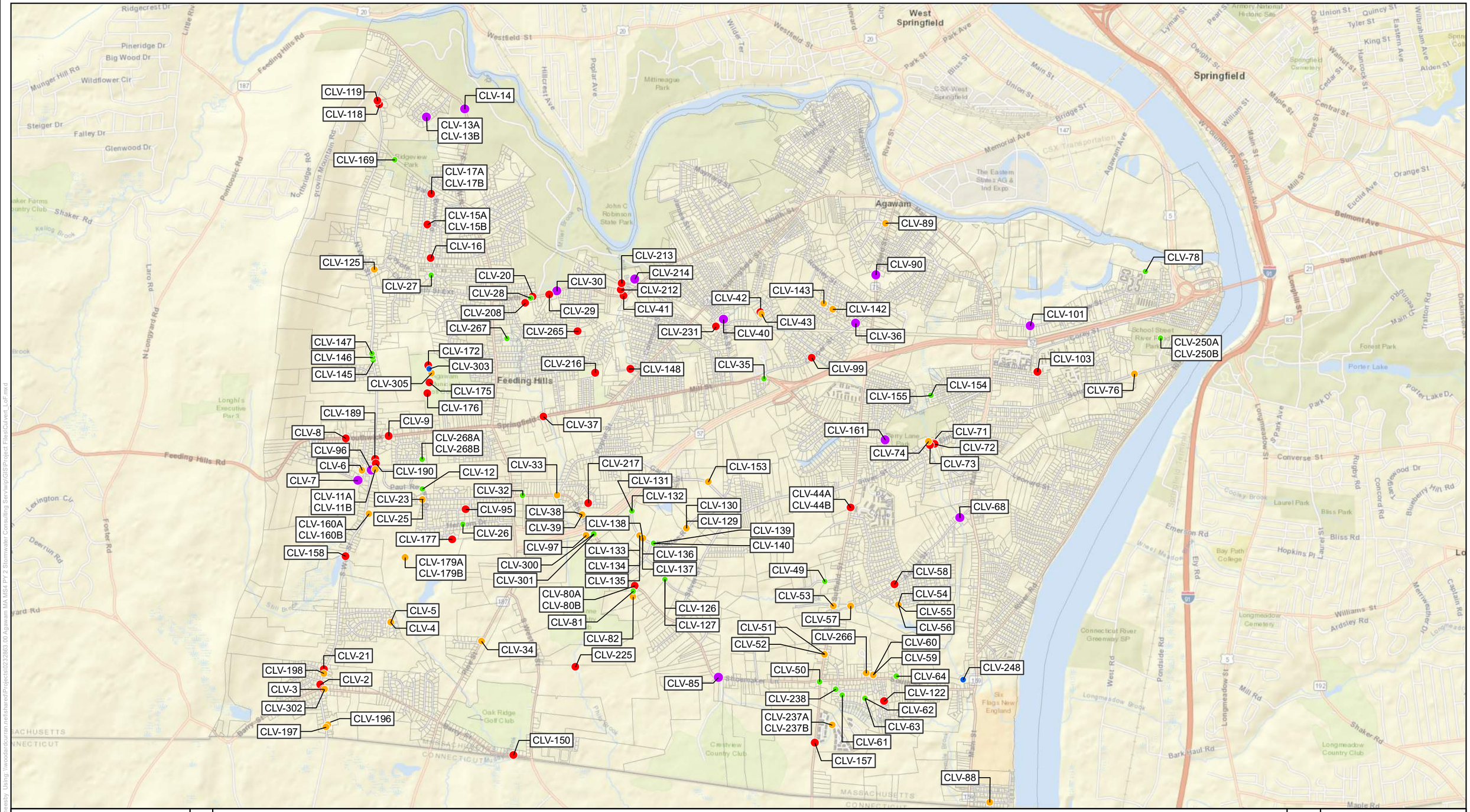
Assessment Status
- Assessed
- Not Assessed

Upstream Photo

Upstream Photo

Downstream Photo

Downstream Photo



Culvert Likelihood of Failure

Agawam, MA

Legend

LoF Category Very High · High · Moderate · Low · Very Low

N

0 0.125 0.25 0.5 0.75 1 Miles

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Project #: 0232863.00
Map Created: February 2021

Third Party GIS Disclaimer: This map is for reference and graphical purposes only and should not be relied upon by third parties for any legal decisions.
Any reliance upon the map or data contained herein shall be at the users' sole risk. **Data Sources:**

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Culvert Likelihood of Failure Summary

Culvert ID	Ownership	Street Name(s)	LoF Score	LoF Category	Culvert Condition	Comments & Observations
CLV-101	Municipal	Meadow St	5	Very High	Very Poor	Poor headwall condition; embankment erosion observed; outfall not a culvert.
CLV-103	Municipal	Corey Street	4	High	Poor	Conduit deterioration observed; cross section deformation; could not locate outlet, inlet more than half filled with sediment; sediment/vegetation removal needed.
CLV-118	Municipal	N West Street	4	High	Poor	Cracking observed; cross section deformation; poor joint/seam condition.
CLV-119	Municipal	N West Street	4	High	Poor	Poor joint and seam condition; sediment/vegetation removal needed; conduit changes material.
CLV-11A	Municipal	Pheasant Hill Dr	3	Moderate	Fair	Conduit deterioration; conduit misalignment.
CLV-11B	Municipal	Pheasant Hill Dr	3	Moderate	Fair	Conduit deterioration; conduit misalignment.
CLV-12	Municipal	Paul Revere Dr	2	Low	Good	
CLV-122	Municipal	Cosgrove Ave	4	High	Poor	Conduit deterioration and cracking observed; poor headwall condition; debris in conduit.
CLV-125	Municipal	Coyote Cir	3	Moderate	Fair	Conduit deterioration; sediment/vegetation removal needed.
CLV-126	Municipal	Herbert P Almgren Dr	2	Low	Good	Sediment/vegetation removal needed.
CLV-127	Municipal	Herbert P Algren Dr	2	Low	Good	Exposed portion of conduit poor; sediment/vegetation removal needed.
CLV-129	Municipal	Bowles Rd	3	Moderate	Fair	Sediment/vegetation removal needed.
CLV-130	Municipal	Bowles Rd	3	Moderate	Fair	Sediment/vegetation removal needed.
CLV-131	Municipal	Bowles Rd	2	Low	Good	
CLV-132	Municipal	Bowles Rd	2	Low	Good	Conduit cracking observed; cross section deformation.
CLV-133	Municipal	Bowles Rd	3	Moderate	Fair	Conduit deterioration observed; cross section deformation; broken flared end.
CLV-134	Municipal	Bowles Rd	3	Moderate	Fair	Conduit deterioration observed; cross section deformation; broken flared end.
CLV-135	Municipal	Bowles Rd	3	Moderate	Fair	Conduit deterioration observed; cross section deformation; broken flared end.
CLV-136	Municipal	Bowles Rd	3	Moderate	Fair	Sediment/vegetation removal needed.
CLV-137	Municipal	Bowles Rd	3	Moderate	Fair	Sediment/vegetation removal needed.
CLV-138	Municipal	Bowles Rd	3	Moderate	Fair	Sediment/vegetation removal needed.
CLV-139	Municipal	Bowles Rd	2	Low	Good	Sediment/vegetation removal needed.
CLV-13A	Municipal	Park Edge Dr	5	Very High	Very Poor	Conduit deterioration and cracking observed; poor joint/seam condition; embankment erosion observed upstream; sediment/vegetation removal needed.

Culvert ID	Ownership	Street Name(s)	LoF Score	LoF Category	Culvert Condition	Comments & Observations
CLV-13B	Municipal	Park Edge Dr	5	Very High	Very Poor	Conduit deterioration and cracking observed; poor joint/seam condition; embankment erosion observed upstream; sediment/vegetation removal needed.
CLV-14	Municipal	N Westfield Street	5	Very High	Very Poor	Conduit deterioration and cracking observed.
CLV-140	Municipal	Bowles Rd	2	Low	Good	
CLV-142	Municipal	Country Rd	3	Moderate	Fair	Conduit deterioration; poor headwall condition; streambed erosion downstream; sediment/vegetation removal needed; drainage system ties directly into conduit.
CLV-143	Municipal	Barn Rd	3	Moderate	Fair	Conduit deterioration observed; poor joint/seam condition.
CLV-145	Municipal	N West St	2	Low	Good	Driveway crossing.
CLV-146	Municipal	N West St	2	Low	Good	Driveway crossing.
CLV-147	Municipal	N West St	2	Low	Good	Driveway crossing.
CLV-148	Municipal	Oak St	4	High	Poor	Conduit deterioration and cracking observed; outlet is projecting.
CLV-150	Municipal	Barry St	4	High	Poor	Conduit deterioration observed; cross section deformation observed; poor joint/seam condition.
CLV-153	Municipal	Garden St	3	Moderate	Fair	Conduit deterioration observed; poor headwall condition; poor joint/seam condition; sediment/vegetation removal needed.
CLV-154	Municipal	Carr Ave	2	Low	Good	Conduit filled with water.
CLV-155	Municipal	Carr Ave	2	Low	Good	
CLV-157	Municipal	Suffield St	4	High	Poor	Conduit deterioration observed; poor headwall condition; poor joint/seam condition; upstream embankment in poor condition.
CLV-158	Municipal	S West St	4	High	Poor	Conduit deterioration observed; cross section deformation; poor joint/seam condition; conduit material changes; embankment erosion observed downstream.
CLV-15A	Municipal	Strawberry Hill Rd	4	High	Poor	Conduit and apron deterioration and corrosion observed; poor headwall condition; outlet is perched; erosion observed underneath apron; fishy smell coming from upstream.
CLV-15B	Municipal	Strawberry Hill Rd	4	High	Poor	Conduit and apron deterioration and corrosion observed; poor headwall condition; outlet is perched; erosion observed underneath apron; fishy smell coming from upstream.
CLV-16	Municipal	Clover Hill Dr	4	High	Poor	Conduit deterioration observed; poor headwall condition; likely a field inlet not a culvert.
CLV-160A	Municipal	Off of S a West St	3	Moderate	Fair	Conduit deterioration observed; poor headwall condition.

Culvert ID	Ownership	Street Name(s)	LoF Score	LoF Category	Culvert Condition	Comments & Observations
CLV-160B	Municipal	Off of S a West St	3	Moderate	Fair	Conduit deterioration observed; poor headwall condition.
CLV-161	Municipal	Perry Lane	5	Very High	Very Poor	Conduit deterioration and cracking observed; cross section deformation observed; embankment erosion observed upstream; outlet projecting; parallel cracking observed in roadway.
CLV-169	Municipal	Off of N West St	2	Low	Good	Sediment/vegetation removal needed.
CLV-172	Municipal	Golf Course	4	High	Poor	Poor joint/seam condition; large offset observed in conduit; upstream is mostly clogged; sediment/vegetation removal needed.
CLV-175	Municipal	Golf Course	4	High	Poor	Conduit deterioration and cracking observed; poor joint/seam condition; joint visible above grade; misalignment of conduit observed.
CLV-176	Municipal	Golf Course	4	High	Poor	Conduit deterioration observed; outlet submerged.
CLV-177	Municipal	Memory Ln	4	High	Poor	Conduit deterioration observed; owner noted flooding is often observed and builder dumped debris in wetland during construction.
CLV-179A	Municipal	Access Road	3	Moderate	Fair	Conduit deterioration observed; large tree blocking access road approximately 0.25 miles from culverts.
CLV-179B	Municipal	Access Road	3	Moderate	Fair	Conduit deterioration observed; large tree blocking access road approximately 0.25 miles from culverts.
CLV-17A	Municipal	Valley Brook Rd	4	High	Poor	Conduit deterioration observed; poor headwall condition; poor joint/seam condition.
CLV-17B	Municipal	Valley Brook Rd	4	High	Poor	Conduit deterioration observed; poor headwall condition; poor joint/seam condition.
CLV-189	Municipal	S West Street	4	High	Poor	Conduit deterioration observed; cross section deformation; oil sheen observed.
CLV-190	Municipal	S West Street	4	High	Poor	Conduit deterioration and cracking observed; conduit dips.
CLV-196	Municipal	Off of S West Street	3	Moderate	Fair	Conduit deterioration; erosion along headwall downstream.
CLV-197	Municipal	S West Street	3	Moderate	Fair	Conduit deterioration.
CLV-198	Municipal	S West Street	3	Moderate	Fair	Poor joint/seam condition; sediment/vegetation removal needed.
CLV-2	Municipal	S West Street	4	High	Poor	Conduit deterioration observed; cross section deformation; conduit material appears to change; sediment/vegetation removal needed.
CLV-20	Municipal	North St	4	High	Poor	Conduit deterioration observed; cross section deformation; conduit 75% filled with water.

Culvert ID	Ownership	Street Name(s)	LoF Score	LoF Category	Culvert Condition	Comments & Observations
CLV-208	Municipal	Off of North St	4	High	Poor	Cross section deformation; sediment/vegetation removal needed; conduit 50-75% filled with water.
CLV-21	Municipal	S West Street	4	High	Poor	Conduit deterioration observed; cross section deformation; poor joint seam condition.
CLV-212	Municipal	Off of North St	4	High	Poor	Conduit deterioration and cracking observed; poor headwall condition; conduit material changes.
CLV-213	Municipal	Off of North St	4	High	Poor	Conduit deterioration observed; poor headwall condition.
CLV-214	Municipal	Off of North St	5	Very High	Very Poor	Conduit deterioration observed, bottom rusted out
CLV-216	Private	Springfield St Cemetery	4	High	Poor	Conduit deterioration observed; poor joint/seam condition; oil sheen observed upstream.
CLV-217	Municipal	Cesan St	4	High	Poor	Conduit deterioration observed; sediment/vegetation removal needed.
CLV-225	Municipal	Access Road off of S Westfield St	4	High	Poor	Conduit deterioration and cracking observed; poor joint/seam condition.
CLV-23	Municipal	Independence Rd	3	Moderate	Fair	Conduit deterioration observed; poor headwall condition.
CLV-231	Municipal	Off of Line St	4	High	Poor	Conduit deterioration observed; poor headwall condition.
CLV-237A	Municipal	Long Brook Estates	3	Moderate	Fair	Conduit deterioration observed; poor joint/seam condition.
CLV-237B	Municipal	Long Brook Estates	3	Moderate	Fair	Conduit deterioration observed; poor joint/seam condition.
CLV-238	Municipal	Deer Run Road	2	Low	Good	Sediment/vegetation removal needed.
CLV-248	Municipal	Off of South St	1	Very Low	Very Good	Sediment/vegetation removal needed; owner noted flooding in the area.
CLV-25	Municipal	Independence Rd	3	Moderate	Fair	Conduit deterioration observed; poor headwall condition.
CLV-250A	Municipal	Path at River Road Park	2	Low	Good	Sediment/vegetation removal needed.
CLV-250B	Municipal	Path at River Road Park	2	Low	Good	Sediment/vegetation removal needed.
CLV-26	Municipal	Herndon Dr	2	Low	Good	Sediment/vegetation removal needed.
CLV-265	Municipal	Ridgeway Dr	4	High	Poor	Conduit deterioration observed; cross section deformation; upstream could not be located; conduit appears to not have a consistent slope; sediment/vegetation removal needed; orange floatable observed downstream.
CLV-266	Municipal	Oxford St	3	Moderate	Fair	Poor joint/seam condition; sediment/vegetation removal needed; drainage system ties directly into conduit.
CLV-267	Municipal	Elizabeth St	2	Low	Good	
CLV-268A	Municipal	Nicole Terrace	2	Low	Good	Conduit and apron deterioration; outlet projected.

Culvert ID	Ownership	Street Name(s)	LoF Score	LoF Category	Culvert Condition	Comments & Observations
CLV-268B	Municipal	Nicole Terrace	2	Low	Good	Conduit and apron deterioration; outlet projected.
CLV-27	Municipal	Roosevelt Ave	2	Low	Good	
CLV-28	Municipal	North St	2	Low	Good	Sediment/vegetation removal needed.
CLV-29	Municipal	North St	4	High	Poor	Conduit deterioration observed, two segments disconnected; poor headwall condition, collapse observed downstream; poor joint/seam condition; infiltration into conduit observed; conduit is misaligned and dips; sediment/vegetation removal needed.
CLV-3	Municipal	Barry Street	4	High	Poor	Conduit deterioration observed; headwall in poor condition; cross section deformation.
CLV-30	Municipal	North St	5	Very High	Very Poor	Conduit deterioration and cracking observed; conduit material changes; erosion observed downstream; outlet projecting; poor joint/seam condition; poor headwall condition; sediment/vegetation removal needed.
CLV-300	Municipal	Shoemaker Ln	2	Low	Good	Sediment/vegetation removal needed.
CLV-301	Municipal	Shoemaker Ln	3	Moderate	Fair	Poor joint/seam condition, misalignment; sediment/vegetation removal needed.
CLV-302	Municipal	Barry Street	3	Moderate	Fair	Conduit deterioration observed; headwalls beginning to deteriorate.
CLV-303	Municipal	Golf Course	1	Very Low	Very Good	
CLV-305	Municipal	Golf Course	3	Moderate	Fair	Poor joint/seam condition.
CLV-32	Municipal	Shoemaker Ln	2	Low	Good	Sediment/vegetation removal needed.
CLV-33	Municipal	Shoemaker Ln	3	Moderate	Fair	Infiltration into conduit observed; poor joint/seam removal.
CLV-34	Municipal	Pine St	3	Moderate	Fair	Conduit deterioration observed; poor headwall condition, downstream headwall tilting forward and embankment may fail; drainage system ties directly into conduit.
CLV-35	Municipal	Holland Dr	2	Low	Good	Sediment/vegetation removal needed.
CLV-36	Municipal	Cooper St	5	Very High	Very Poor	Conduit deterioration with visible hole observed; poor headwall condition; poor joint/seam condition; downstream bank and embankment beginning to fail.
CLV-37	Municipal	Springfield St	4	High	Poor	Conduit deterioration observed; erosion along upstream headwall; drainage system ties directly into conduit.
CLV-38	Municipal	Shoemaker Ln	3	Moderate	Fair	Cross section deformation; sediment/vegetation removal needed; conduit bends.
CLV-39	Municipal	Shoemaker Ln	3	Moderate	Fair	Sediment/vegetation removal needed.
CLV-4	Municipal	White Fox Rd	3	Moderate	Fair	Conduit deterioration and cracking observed.

Culvert ID	Ownership	Street Name(s)	LoF Score	LoF Category	Culvert Condition	Comments & Observations
CLV-40	Municipal	Line St	5	Very High	Very Poor	Conduit deterioration observed; infiltration into conduit observed; conduit material changes; downstream bank and embankment erosion observed; sediment/vegetation removal needed.
CLV-41	Municipal	North St	4	High	Poor	Conduit deterioration and cracking observed; embankment and streambank erosion observed up and downstream; conduit bends; drainage system connects directly into the conduit.
CLV-42	Municipal	Off of Blair's Hill Rd	4	High	Poor	Conduit deterioration and cracking observed; bottom of conduit rusting out.
CLV-43	Municipal	Blair's Hill Rd	3	Moderate	Fair	Conduit deterioration and cracking observed.
CLV-44A	Municipal	Suffield Street	4	High	Poor	Conduit deterioration observed; poor headwall condition; sediment/vegetation removal needed; conduit mostly filled with water.
CLV-44B	Municipal	Suffield Street	4	High	Poor	Conduit deterioration observed; poor headwall condition; sediment/vegetation removal needed; conduit mostly filled with water.
CLV-49	Municipal	Gold St	2	Low	Good	Upstream structure with catch basin on top observed.
CLV-5	Municipal	White Fox Rd	3	Moderate	Fair	Conduit deterioration observed.
CLV-50	Municipal	Suffield St	2	Low	Good	
CLV-51	Municipal	Suffield St	3	Moderate	Fair	Sediment/vegetation removal needed.
CLV-52	Municipal	Suffield St	3	Moderate	Fair	Conduit deterioration observed; poor joint/seam condition; sediment/vegetation removal needed.
CLV-53	Municipal	Suffield St	3	Moderate	Fair	Conduit deterioration and cracking observed; sediment/vegetation removal needed.
CLV-54	Private	Off of Mallard Cir	3	Moderate	Fair	Conduit deterioration observed; oil sheen observed downstream; sediment/vegetation removal needed.
CLV-55	Private	Off of Mallard Cir	3	Moderate	Fair	Conduit deterioration observed; oil sheen observed downstream; sediment/vegetation removal needed.
CLV-56	Private	Off of Mallard Cir	3	Moderate	Fair	Conduit deterioration observed; oil sheen observed downstream; sediment/vegetation removal needed.
CLV-57	Municipal	Adams St	3	Moderate	Fair	Conduit deterioration observed; outlet projecting and perched.
CLV-58	Municipal	Adams St	4	High	Poor	Conduit deterioration observed; cross section deformation; sediment/vegetation removal needed.
CLV-59	Municipal	Equine Blvd	3	Moderate	Fair	Cross section deformation; embankment and headwall collapse observed downstream; conduit does not appear to have a consistent slope; sediment/vegetation removal needed.

Culvert ID	Ownership	Street Name(s)	LoF Score	LoF Category	Culvert Condition	Comments & Observations
CLV-6	Municipal	Tobacco Farm Road	3	Moderate	Fair	Conduit misalignment at downstream joints.
CLV-60	Municipal	Equine Blvd	3	Moderate	Fair	Cross section deformation; embankment and headwall collapse observed downstream; conduit does not appear to have a consistent slope; sediment/vegetation removal needed.
CLV-61	Municipal	Deer Run Road	2	Low	Good	Cannot access inlet due to hedges and fence.
CLV-62	Municipal	Quail Hollow Road	3	Moderate	Fair	Infiltration into conduit observed; sediment/vegetation removal needed.
CLV-63	Municipal	Quail Hollow Road	2	Low	Good	Sediment/vegetation removal needed; ties directly into conduit
CLV-64	Municipal	Jade Lane	2	Low	Good	Sediment/vegetation removal needed; drainage system ties directly into conduit
CLV-68	Municipal	Adams St	5	Very High	Very Poor	Conduit deterioration and cracking observed; poor joint/seam condition; utilities present on outside of culvert.
CLV-7	Municipal	Kosak Ct	5	Very High	Very Poor	Conduit deterioration and cracking observed; poor joint condition; sediment/vegetation removal needed
CLV-71	Municipal	Elm St	4	High	Poor	Conduit deterioration observed; connects directly into CLV-72.
CLV-72	Municipal	Elm St	4	High	Poor	Conduit deterioration observed; poor headwall condition; poor joint/seam condition; utility observed through conduit; connects directly into CLV-71.
CLV-73	Municipal	Elm St	4	High	Poor	Conduit deterioration observed; poor headwall condition, utilities penetrate headwall; utilities observed through conduit.
CLV-74	Private	off of Elm St	3	Moderate	Fair	Conduit deterioration observed.
CLV-76	Municipal	School St	3	Moderate	Fair	Minor cracking observed; poor headwall condition.
CLV-78	Municipal	Office Park	2	Low	Good	Sediment/vegetation removal needed.
CLV-8	Municipal	Southwick St	4	High	Poor	Conduit deterioration and cracking observed; poor headwall condition.
CLV-80A	Municipal	Shoemaker Ln	4	High	Poor	Conduit deterioration observed; cross section deformation observed; poor joint/seam condition; sediment/vegetation removal needed.
CLV-80B	Municipal	Shoemaker Ln	4	High	Poor	Conduit deterioration observed; cross section deformation observed; poor joint/seam condition; sediment/vegetation removal needed.
CLV-81	Municipal	Off of Shoemaker Ln	2	Low	Good	Sediment/vegetation removal needed.
CLV-82	Municipal	Off of Shoemaker Ln	3	Moderate	Fair	Conduit deterioration observed.
CLV-85	Municipal	Shoemaker Ln	5	Very High	Very Poor	Sediment/vegetation removal needed; outlet possibly collapsed, could not locate.

Culvert ID	Ownership	Street Name(s)	LoF Score	LoF Category	Culvert Condition	Comments & Observations
CLV-88	Municipal	Kanawha Drive	3	Moderate	Fair	Conduit 40% filled with debris; conduit bends; sediment/vegetation removal needed.
CLV-89	Municipal	Walnut St Ext	3	Moderate	Fair	Conduit deterioration observed; poor joint/seam condition; connects into manhole; cannot locate outlet.
CLV-9	Municipal	Southwick St	4	High	Poor	Conduit deterioration observed; poor headwall condition; poor joint/seam condition; small box culvert adjacent to culvert.
CLV-90	Municipal	Suffield St	5	Very High	Very Poor	Conduit deterioration and cracking observed; poor headwall condition observed; conduit is 40% blocked with roots; conduit material changes; embankment erosion observed upstream.
CLV-95	Municipal	Elmar Dr	4	High	Poor	Cracking observed; erosion observed behind downstream headwall; conduit connects into manhole.
CLV-96	Municipal	S West Street	5	Very High	Very Poor	Conduit very deteriorated.
CLV-97	Municipal	Off of Shoemaker Ln	3	Moderate	Fair	Conduit deterioration and cracking observed; conduit deterioration; erosion downstream; conduit bends.
CLV-99	Municipal	Cooper St	4	High	Poor	Conduit deterioration observed; poor headwall condition; outlet perched and projecting.

Culvert Consequence of Failure

Agawam, MA

Legend

CoF Category Very High · High · Moderate · Low · Very Low

0 0.125 0.25 0.5 0.75 1 Miles

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WOODARD &CURRAN

Project #: 0232863.00
Map Created: February 2021

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Culvert Consequence of Failure Table

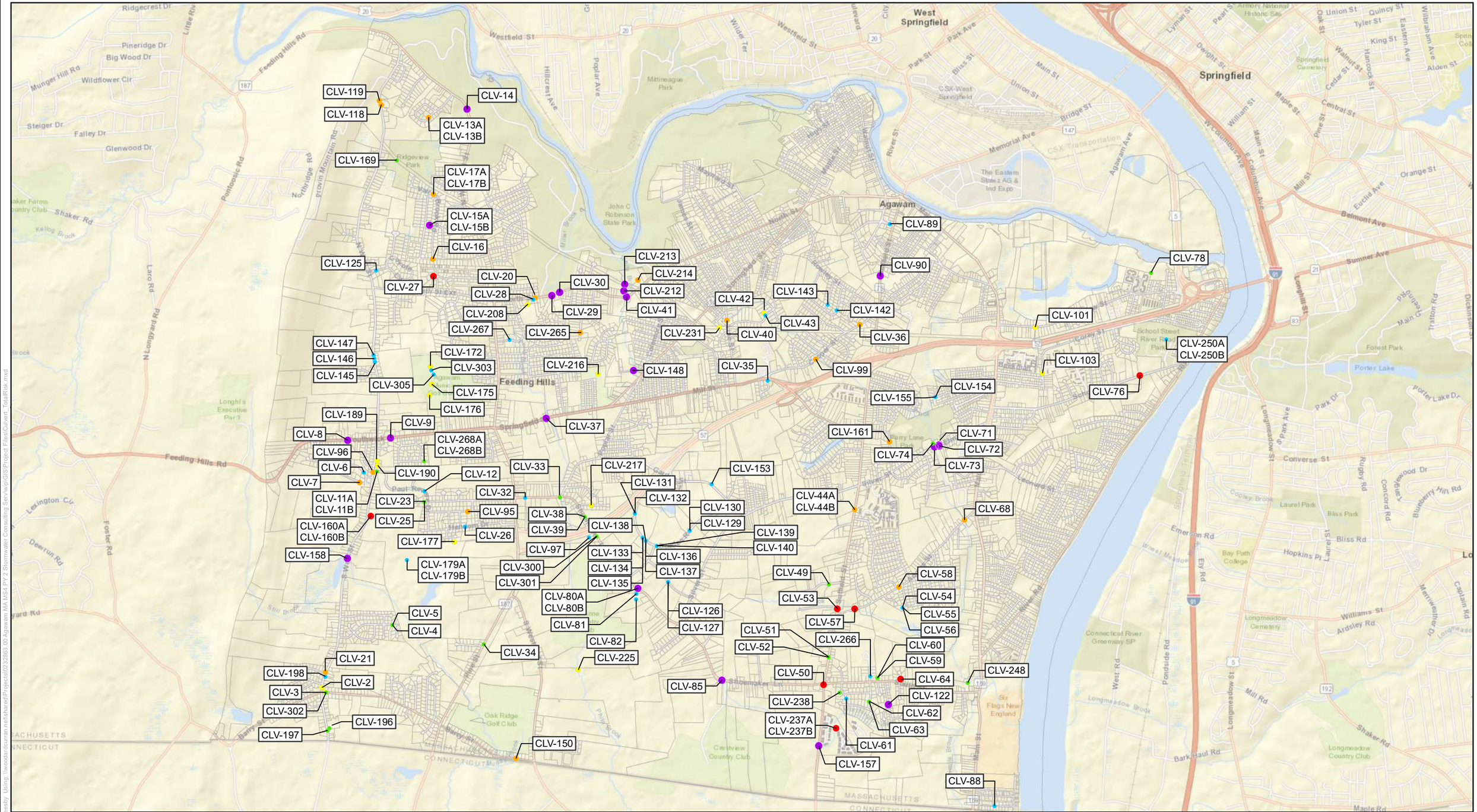
Culvert ID	Street Name(s)	Street Classification Score	Pipe Diameter Score	Pipe Cover Score	CoF Score	CoF Category
CLV-101	Meadow St	1	N/A	N/A	1.00	Very Low
CLV-103	Corey Street	1	1	2	1.33	Low
CLV-118	N West Street	3	3	2	2.67	Moderate
CLV-119	N West Street	5	2	1	2.67	Moderate
CLV-11A	Pheasant Hill Dr	1	3	4	2.67	Moderate
CLV-11B	Pheasant Hill Dr	1	3	4	2.67	Moderate
CLV-12	Paul Revere Dr	1	4	2	2.33	Moderate
CLV-122	Cosgrove Ave	3	4	3	3.33	High
CLV-125	Coyote Cir	1	2	3	2.00	Low
CLV-126	Herbert P Almgren Dr	1	2	3	2.00	Low
CLV-127	Herbert P Algren Dr	1	N/A	3	2.00	Low
CLV-129	Bowles Rd	1	2	3	2.00	Low
CLV-130	Bowles Rd	1	2	3	2.00	Low
CLV-131	Bowles Rd	1	3	2	2.00	Low
CLV-132	Bowles Rd	1	3	2	2.00	Low
CLV-133	Bowles Rd	1	2	3	2.00	Low
CLV-134	Bowles Rd	1	2	3	2.00	Low
CLV-135	Bowles Rd	1	2	3	2.00	Low
CLV-136	Bowles Rd	1	2	3	2.00	Low
CLV-137	Bowles Rd	1	2	3	2.00	Low
CLV-138	Bowles Rd	1	2	3	2.00	Low
CLV-139	Bowles Rd	1	2	3	2.00	Low
CLV-13A	Park Edge Dr	1	3	3	2.33	Moderate
CLV-13B	Park Edge Dr	1	3	3	2.33	Moderate
CLV-14	N Westfield Street	4	5	4	4.33	Very High
CLV-140	Bowles Rd	1	2	3	2.00	Low
CLV-142	Country Rd	1	3	3	2.33	Moderate
CLV-143	Barn Rd	1	3	3	2.33	Moderate
CLV-145	N West St	3	1	1	1.67	Low
CLV-146	N West St	3	1	1	1.67	Low
CLV-147	N West St	3	1	1	1.67	Low
CLV-148	Oak St	3	3	5	3.67	High

Culvert ID	Street Name(s)	Street Classification Score	Pipe Diameter Score	Pipe Cover Score	CoF Score	CoF Category
CLV-150	Barry St	3	3	3	3.00	Moderate
CLV-153	Garden St	3	2	1	2.00	Low
CLV-154	Carr Ave	3	2	2	2.33	Moderate
CLV-155	Carr Ave	3	2	2	2.33	Moderate
CLV-157	Suffield St	4	3	3	3.33	High
CLV-158	S West St	3	4	3	3.33	High
CLV-15A	Strawberry Hill Rd	1	5	4	3.33	High
CLV-15B	Strawberry Hill Rd	1	5	4	3.33	High
CLV-16	Clover Hill Dr	2	4	2	2.67	Moderate
CLV-160A	Off of S a West St	3	5	5	4.33	Very High
CLV-160B	Off of S a West St	3	5	5	4.33	Very High
CLV-161	Perry Lane	1	4	1	2.00	Low
CLV-169	Off of N West St	1	3	4	2.67	Moderate
CLV-172	Golf Course	1	1	1	1.00	Very Low
CLV-175	Golf Course	1	2	1	1.33	Low
CLV-176	Golf Course	1	2	1	1.33	Low
CLV-177	Memory Ln	1	2	1	1.33	Low
CLV-179A	Access Road	1	2	1	1.33	Low
CLV-179B	Access Road	1	2	1	1.33	Low
CLV-17A	Valley Brook Rd	1	5	2	2.67	Moderate
CLV-17B	Valley Brook Rd	1	5	2	2.67	Moderate
CLV-189	S West Street	3	2	2	2.33	Moderate
CLV-190	S West Street	3	3	1	2.33	Moderate
CLV-196	Off of S West Street	3	5	1	3.00	Moderate
CLV-197	S West Street	1	5	3	3.00	Moderate
CLV-198	S West Street	1	3	2	2.00	Moderate
CLV-2	S West Street	3	1	2	2.00	Low
CLV-20	North St	4	3	2	3.00	Moderate
CLV-208	Off of North St	1	3	2	2.00	Moderate
CLV-21	S West Street	3	3	2	2.67	Moderate
CLV-212	Off of North St	1	4	5	3.33	High
CLV-213	Off of North St	1	5	4	3.33	High
CLV-214	Off of North St	3	2	3	2.67	Moderate
CLV-216	Springfield St Cemetery	1	3	2	2.00	Low
CLV-217	Cesan St	1	1	4	2.00	Low

Culvert ID	Street Name(s)	Street Classification Score	Pipe Diameter Score	Pipe Cover Score	CoF Score	CoF Category
CLV-225	Access Road off of S Westfield St	1	4	1	2.00	Low
CLV-23	Independence Rd	3	3	3	3.00	Moderate
CLV-231	Off of Line St	1	3	3	2.33	Moderate
CLV-237A	Long Brook Estates	3	5	5	4.33	Very High
CLV-237B	Long Brook Estates	3	5	5	4.33	Very High
CLV-238	Deer Run Road	3	4	1	2.67	Moderate
CLV-248	Off of South St	3	5	1	3.00	Moderate
CLV-25	Independence Rd	3	3	3	3.00	Moderate
CLV-250A	Path at River Road Park	1	2	2	1.67	Low
CLV-250B	Path at River Road Park	1	2	2	1.67	Low
CLV-26	Herndon Dr	1	3	2	2.00	Low
CLV-265	Ridgeway Dr	3	2	3	2.67	Moderate
CLV-266	Oxford St	3	3	1	2.33	Moderate
CLV-267	Elizabeth St	1	1	2	1.33	Low
CLV-268A	Nicole Terrace	3	3	2	2.67	Moderate
CLV-268B	Nicole Terrace	3	3	2	2.67	Moderate
CLV-27	Roosevelt Ave	3	4	3	3.33	High
CLV-28	North St	3	2	1	2.00	Low
CLV-29	North St	4	2	5	3.67	High
CLV-3	Barry Street	3	2	2	2.33	Moderate
CLV-30	North St	4	2	5	3.67	High
CLV-300	Shoemaker Ln	3	3	3	3.00	Moderate
CLV-301	Shoemaker Ln	3	2	3	2.67	Moderate
CLV-302	Barry Street	3	3	2	2.67	Moderate
CLV-303	Golf Course	1	2	1	1.33	Low
CLV-305	Golf Course	1	1	1	1.00	Very Low
CLV-32	Shoemaker Ln	3	2	2	2.33	Moderate
CLV-33	Shoemaker Ln	3	4	1	2.67	Moderate
CLV-34	Pine St	4	3	2	3.00	Moderate
CLV-35	Holland Dr	1	2	1	1.33	Low
CLV-36	Cooper St	3	4	3	3.33	High
CLV-37	Springfield St	5	5	2	4.00	High
CLV-38	Shoemaker Ln	3	2	3	2.67	Moderate
CLV-39	Shoemaker Ln	3	3	3	3.00	Moderate
CLV-4	White Fox Rd	3	3	2	2.67	Moderate

Culvert ID	Street Name(s)	Street Classification Score	Pipe Diameter Score	Pipe Cover Score	CoF Score	CoF Category
CLV-40	Line St	1	2	4	2.33	Moderate
CLV-41	North St	4	4	5	4.33	Very High
CLV-42	Off of Blair's Hill Rd	1	3	1	1.67	Low
CLV-43	Blair's Hill Rd	1	3	3	2.33	Moderate
CLV-44A	Suffield Street	4	3	2	3.00	Moderate
CLV-44B	Suffield Street	4	3	2	3.00	Moderate
CLV-49	Gold St	1	4	3	2.67	Moderate
CLV-5	White Fox Rd	3	3	2	2.67	Moderate
CLV-50	Suffield St	4	3	4	3.67	High
CLV-51	Suffield St	4	3	2	3.00	Moderate
CLV-52	Suffield St	4	3	2	3.00	Moderate
CLV-53	Suffield St	4	5	5	4.67	Very High
CLV-54	Off of Mallard Cir	1	2	3	2.00	Low
CLV-55	Off of Mallard Cir	1	2	3	2.00	Low
CLV-56	Off of Mallard Cir	1	2	3	2.00	Low
CLV-57	Adams St	3	5	2	3.33	High
CLV-58	Adams St	3	4	1	2.67	Moderate
CLV-59	Equine Blvd	3	2	3	2.67	Moderate
CLV-6	Tobacco Farm Road	1	3	3	2.33	Moderate
CLV-60	Equine Blvd	3	2	3	2.67	Moderate
CLV-61	Deer Run Road	1	4	2	2.33	Moderate
CLV-62	Quail Hollow Road	1	3	4	2.67	Moderate
CLV-63	Quail Hollow Road	1	3	4	2.67	Moderate
CLV-64	Jade Lane	3	5	4	4.00	High
CLV-68	Adams St	3	5	2	3.33	High
CLV-7	Kosak Ct	1	2	4	2.33	Moderate
CLV-71	Elm St	3	4	3	3.33	High
CLV-72	Elm St	3	5	2	3.33	High
CLV-73	Elm St	3	5	2	3.33	High
CLV-74	off of Elm St	1	5	2	2.67	Moderate
CLV-76	School St	3	4	4	3.67	Moderate
CLV-78	Office Park	3	4	2	3.00	Moderate
CLV-8	Southwick St	5	5	2	4.00	High
CLV-80A	Shoemaker Ln	3	2	5	3.33	High
CLV-80B	Shoemaker Ln	3	2	5	3.33	High

Culvert ID	Street Name(s)	Street Classification Score	Pipe Diameter Score	Pipe Cover Score	CoF Score	CoF Category
CLV-81	Off of Shoemaker Ln	3	2	2	2.33	Moderate
CLV-82	Off of Shoemaker Ln	1	3	1	1.67	Low
CLV-85	Shoemaker Ln	3	N/A	4	3.50	High
CLV-88	Kanawha Drive	1	2	2	1.67	Low
CLV-89	Walnut St Ext	1	3	3	2.33	Moderate
CLV-9	Southwick St	5	5	4	4.67	Very High
CLV-90	Suffield St	4	3	4	3.67	High
CLV-95	Elmar Dr	1	3	4	2.67	Moderate
CLV-96	S West Street	3	5	2	3.33	High
CLV-97	Off of Shoemaker Ln	1	3	1	1.67	Low
CLV-99	Cooper St	3	3	2	2.67	Moderate



Culvert Total Risk of Failure

Agawam, MA

Legend

Risk Action Level

- Immediate Action
- Frequent Assessment
- High Priority Renewal
- Mid Priority Renewal
- Regular Monitoring
- Sample Assessment

0 0.125 0.25 0.5 0.75 1 Miles

N

WOODARD &CURRAN

Project #: 0232863.00
Map Created: February 2021

Figure Exported: 2/2/2021 By: esneesby Using: \\woodardcurran.net\shared\Projects\0232863.00 Agawam MA MS4 PY 2 Stormwater Consulting Services\gis\GIS\Proj

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Any reliance upon the map or data contained herein shall be at the users' sole risk. **Data Sources:**

Culvert Risk Analysis & Prioritization Table

Culvert ID	Street Name(s)	LoF Score	CoF Score	Risk Score	Prioritization	Action Level
CLV-101	Meadow St	5	1.00	5.00	118	Mid Priority Renewal
CLV-103	Corey Street	4	1.33	5.33	108	Mid Priority Renewal
CLV-118	N West Street	4	2.67	10.67	41	High Priority Renewal
CLV-119	N West Street	4	2.67	10.67	42	High Priority Renewal
CLV-11A	Pheasant Hill Dr	3	2.67	8.00	71	Regular Monitoring
CLV-11B	Pheasant Hill Dr	3	2.67	8.00	72	Regular Monitoring
CLV-12	Paul Revere Dr	2	2.33	4.67	122	Sample Assessment
CLV-122	Cosgrove Ave	4	3.33	13.33	22	Immediate Action
CLV-125	Coyote Cir	3	2.00	6.00	94	Sample Assessment
CLV-126	Herbert P Almgren Dr	2	2.00	4.00	129	Sample Assessment
CLV-127	Herbert P Algren Dr	2	2.00	4.00	130	Sample Assessment
CLV-129	Bowles Rd	3	2.00	6.00	95	Sample Assessment
CLV-130	Bowles Rd	3	2.00	6.00	96	Sample Assessment
CLV-131	Bowles Rd	2	2.00	4.00	131	Sample Assessment
CLV-132	Bowles Rd	2	2.00	4.00	132	Sample Assessment
CLV-133	Bowles Rd	3	2.00	6.00	97	Sample Assessment
CLV-134	Bowles Rd	3	2.00	6.00	98	Sample Assessment
CLV-135	Bowles Rd	3	2.00	6.00	99	Sample Assessment
CLV-136	Bowles Rd	3	2.00	6.00	100	Sample Assessment
CLV-137	Bowles Rd	3	2.00	6.00	101	Sample Assessment
CLV-138	Bowles Rd	3	2.00	6.00	102	Sample Assessment
CLV-139	Bowles Rd	2	2.00	4.00	133	Sample Assessment
CLV-13A	Park Edge Dr	5	2.33	11.67	36	High Priority Renewal
CLV-13B	Park Edge Dr	5	2.33	11.67	37	High Priority Renewal
CLV-14	N Westfield Street	5	4.33	21.67	1	Immediate Action
CLV-140	Bowles Rd	2	2.00	4.00	134	Sample Assessment
CLV-142	Country Rd	3	2.33	7.00	84	Sample Assessment
CLV-143	Barn Rd	3	2.33	7.00	85	Sample Assessment
CLV-145	N West St	2	1.67	3.33	139	Sample Assessment
CLV-146	N West St	2	1.67	3.33	140	Sample Assessment
CLV-147	N West St	2	1.67	3.33	141	Sample Assessment

Culvert ID	Street Name(s)	LoF Score	CoF Score	Risk Score	Prioritization	Action Level
CLV-148	Oak St	4	3.67	14.67	10	Immediate Action
CLV-150	Barry St	4	3.00	12.00	32	High Priority Renewal
CLV-153	Garden St	3	2.00	6.00	103	Sample Assessment
CLV-154	Carr Ave	2	2.33	4.67	123	Sample Assessment
CLV-155	Carr Ave	2	2.33	4.67	124	Sample Assessment
CLV-157	Suffield St	4	3.33	13.33	21	Immediate Action
CLV-158	S West St	4	3.33	13.33	20	Immediate Action
CLV-15A	Strawberry Hill Rd	4	3.33	13.33	19	Immediate Action
CLV-15B	Strawberry Hill Rd	4	3.33	13.33	18	Immediate Action
CLV-16	Clover Hill Dr	4	2.67	10.67	43	High Priority Renewal
CLV-160A	Off of S a West St	3	4.33	13.00	28	Frequent Assessment
CLV-160B	Off of S a West St	3	4.33	13.00	29	Frequent Assessment
CLV-161	Perry Lane	5	2.00	10.00	52	High Priority Renewal
CLV-169	Off of N West St	2	2.67	5.33	112	Regular Monitoring
CLV-172	Golf Course	4	1.00	4.00	128	Mid Priority Renewal
CLV-175	Golf Course	4	1.33	5.33	109	Mid Priority Renewal
CLV-176	Golf Course	4	1.33	5.33	110	Mid Priority Renewal
CLV-177	Memory Ln	4	1.33	5.33	111	Mid Priority Renewal
CLV-179A	Access Road	3	1.33	4.00	135	Sample Assessment
CLV-179B	Access Road	3	1.33	4.00	136	Sample Assessment
CLV-17A	Valley Brook Rd	4	2.67	10.67	44	High Priority Renewal
CLV-17B	Valley Brook Rd	4	2.67	10.67	45	High Priority Renewal
CLV-189	S West Street	4	2.33	9.33	53	Mid Priority Renewal
CLV-190	S West Street	4	2.33	9.33	54	Mid Priority Renewal
CLV-196	Off of S West Street	3	3.00	9.00	57	Regular Monitoring
CLV-197	S West Street	3	3.00	9.00	58	Regular Monitoring
CLV-198	S West Street	3	2.00	6.00	104	Sample Assessment
CLV-2	S West Street	4	2.00	8.00	66	Mid Priority Renewal
CLV-20	North St	4	3.00	12.00	33	High Priority Renewal
CLV-208	Off of North St	4	2.00	8.00	67	Mid Priority Renewal
CLV-21	S West Street	4	2.67	10.67	46	High Priority Renewal
CLV-212	Off of North St	4	3.33	13.33	17	Immediate Action
CLV-213	Off of North St	4	3.33	13.33	16	Immediate Action
CLV-214	Off of North St	5	2.67	13.33	27	High Priority Renewal

Culvert ID	Street Name(s)	LoF Score	CoF Score	Risk Score	Prioritization	Action Level
CLV-216	Springfield St Cemetery	4	2.00	8.00	68	Mid Priority Renewal
CLV-217	Cesan St	4	2.00	8.00	69	Mid Priority Renewal
CLV-225	Access Road off of S Westfield St	4	2.00	8.00	70	Mid Priority Renewal
CLV-23	Independence Rd	3	3.00	9.00	59	Regular Monitoring
CLV-231	Off of Line St	4	2.33	9.33	55	Mid Priority Renewal
CLV-237A	Long Brook Estates	3	4.33	13.00	30	Frequent Assessment
CLV-237B	Long Brook Estates	3	4.33	13.00	31	Frequent Assessment
CLV-238	Deer Run Road	2	2.67	5.33	113	Regular Monitoring
CLV-248	Off of South St	1	3.00	3.00	144	Regular Monitoring
CLV-25	Independence Rd	3	3.00	9.00	60	Regular Monitoring
CLV-250A	Path at River Road Park	2	1.67	3.33	142	Sample Assessment
CLV-250B	Path at River Road Park	2	1.67	3.33	143	Sample Assessment
CLV-26	Herndon Dr	2	2.00	4.00	137	Sample Assessment
CLV-265	Ridgeway Dr	4	2.67	10.67	47	High Priority Renewal
CLV-266	Oxford St	3	2.33	7.00	86	Sample Assessment
CLV-267	Elizabeth St	2	1.33	2.67	146	Sample Assessment
CLV-268A	Nicole Terrace	2	2.67	5.33	114	Regular Monitoring
CLV-268B	Nicole Terrace	2	2.67	5.33	115	Regular Monitoring
CLV-27	Roosevelt Ave	2	3.33	6.67	90	Frequent Assessment
CLV-28	North St	2	2.00	4.00	138	Sample Assessment
CLV-29	North St	4	3.67	14.67	9	Immediate Action
CLV-3	Barry Street	4	2.33	9.33	56	Mid Priority Renewal
CLV-30	North St	5	3.67	18.33	3	Immediate Action
CLV-300	Shoemaker Ln	2	3.00	6.00	92	Regular Monitoring
CLV-301	Shoemaker Ln	3	2.67	8.00	73	Regular Monitoring
CLV-302	Barry Street	3	2.67	8.00	74	Regular Monitoring
CLV-303	Golf Course	1	1.33	1.33	148	Sample Assessment
CLV-305	Golf Course	3	1.00	3.00	145	Sample Assessment
CLV-32	Shoemaker Ln	2	2.33	4.67	125	Sample Assessment
CLV-33	Shoemaker Ln	3	2.67	8.00	75	Regular Monitoring
CLV-34	Pine St	3	3.00	9.00	61	Regular Monitoring
CLV-35	Holland Dr	2	1.33	2.67	147	Sample Assessment
CLV-36	Cooper St	5	3.33	16.67	23	High Priority Renewal

Culvert ID	Street Name(s)	LoF Score	CoF Score	Risk Score	Prioritization	Action Level
CLV-37	Springfield St	4	4.00	16.00	8	Immediate Action
CLV-38	Shoemaker Ln	3	2.67	8.00	76	Regular Monitoring
CLV-39	Shoemaker Ln	3	3.00	9.00	62	Regular Monitoring
CLV-4	White Fox Rd	3	2.67	8.00	77	Regular Monitoring
CLV-40	Line St	5	2.33	11.67	38	High Priority Renewal
CLV-41	North St	4	4.33	17.33	6	Immediate Action
CLV-42	Off of Blair's Hill Rd	4	1.67	6.67	91	Mid Priority Renewal
CLV-43	Blair's Hill Rd	3	2.33	7.00	87	Sample Assessment
CLV-44A	Suffield Street	4	3.00	12.00	34	High Priority Renewal
CLV-44B	Suffield Street	4	3.00	12.00	35	High Priority Renewal
CLV-49	Gold St	2	2.67	5.33	116	Regular Monitoring
CLV-5	White Fox Rd	3	2.67	8.00	78	Regular Monitoring
CLV-50	Suffield St	2	3.67	7.33	83	Frequent Assessment
CLV-51	Suffield St	3	3.00	9.00	63	Regular Monitoring
CLV-52	Suffield St	3	3.00	9.00	64	Regular Monitoring
CLV-53	Suffield St	3	4.67	14.00	26	Frequent Assessment
CLV-54	Off of Mallard Cir	3	2.00	6.00	105	Sample Assessment
CLV-55	Off of Mallard Cir	3	2.00	6.00	106	Sample Assessment
CLV-56	Off of Mallard Cir	3	2.00	6.00	107	Sample Assessment
CLV-57	Adams St	3	3.33	10.00	51	Frequent Assessment
CLV-58	Adams St	4	2.67	10.67	48	High Priority Renewal
CLV-59	Equine Blvd	3	2.67	8.00	79	Regular Monitoring
CLV-6	Tobacco Farm Road	3	2.33	7.00	88	Sample Assessment
CLV-60	Equine Blvd	3	2.67	8.00	80	Regular Monitoring
CLV-61	Deer Run Road	2	2.33	4.67	126	Sample Assessment
CLV-62	Quail Hollow Road	3	2.67	8.00	81	Regular Monitoring
CLV-63	Quail Hollow Road	2	2.67	5.33	117	Regular Monitoring
CLV-64	Jade Lane	2	4.00	8.00	65	Frequent Assessment
CLV-68	Adams St	5	3.33	16.67	24	High Priority Renewal
CLV-7	Kosak Ct	5	2.33	11.67	39	High Priority Renewal
CLV-71	Elm St	4	3.33	13.33	15	Immediate Action
CLV-72	Elm St	4	3.33	13.33	14	Immediate Action
CLV-73	Elm St	4	3.33	13.33	13	Immediate Action
CLV-74	off of Elm St	3	2.67	8.00	82	Regular Monitoring
CLV-76	School St	3	3.67	11.00	40	Frequent Assessment

Culvert ID	Street Name(s)	LoF Score	CoF Score	Risk Score	Prioritization	Action Level
CLV-78	Office Park	2	3.00	6.00	93	Regular Monitoring
CLV-8	Southwick St	4	4.00	16.00	7	Immediate Action
CLV-80A	Shoemaker Ln	4	3.33	13.33	12	Immediate Action
CLV-80B	Shoemaker Ln	4	3.33	13.33	11	Immediate Action
CLV-81	Off of Shoemaker Ln	2	2.33	4.67	127	Sample Assessment
CLV-82	Off of Shoemaker Ln	3	1.67	5.00	119	Sample Assessment
CLV-85	Shoemaker Ln	5	3.50	17.50	5	Immediate Action
CLV-88	Kanawha Drive	3	1.67	5.00	120	Sample Assessment
CLV-89	Walnut St Ext	3	2.33	7.00	89	Sample Assessment
CLV-9	Southwick St	4	4.67	18.67	2	Immediate Action
CLV-90	Suffield St	5	3.67	18.33	4	Immediate Action
CLV-95	Elmar Dr	4	2.67	10.67	49	High Priority Renewal
CLV-96	S West Street	5	3.33	16.67	25	High Priority Renewal
CLV-97	Off of Shoemaker Ln	3	1.67	5.00	121	Sample Assessment
CLV-99	Cooper St	4	2.67	10.67	50	High Priority Renewal

APPENDIX C: STORM DRAIN ASSESSMENT MAPS & TABLES

Eastwood Dr
Rachel Tet
E Mountain Rd
Dewey St
Rogers Ave
Sibley Ave
Ohio Ave
Greystone Ave
Ely Ave
Lancaster Ave
Woodmont St
Morton St
Elm St
Riverside Rd
Kenefick Park
Piper Brook
Beth Israel Cemetery
City View Ave
Kings Hwy
Town of West Springfield
West Springfield
Westfield River
CSXT
Springfield Rd
Feeding Hills Rd
Westfield St
Hillcrest Ave
Poplar Ave
Mittineague Park
Block Brook
South Blvd
Park St
Bliss St
Union
CSX-West Springfield
CSX-West St
River St
Memorial Ave
The Eastern States AG & Ind Expo
Agawam
Pontoosic Rd
Northridge Rd
Provin
Longhi's Executive Par 3
Stony Knoll
CONNECTICUT
Muddy Brook
King Hill
Sumner Ave
Forest Park
Pecousic Brook
Entry
Park Dr
Pontet Lake Dr
S Park Ave
Converse St
Tanglewood Dr
Blueberry Hill Rd
Pinewood Dr
Cooley Brook
Laurel Park
Bliss Park
Laurel St
Bliss Rd
Emerson Rd
Bay Path College
Hopkins Pl
Longmeadow
Wheel Meadow Brook
Ely Rd
Williams St
Meadowcrest Dr
Captain Rd
Longmeadow Cemetery
Ardsley Rd
Connecticut River Greenway SP
West Rd
Springfield Terminal
Pondside Rd
Longmeadow Brook
Longmeadow Country Club
Mill Rd
Shaker Rd
Inverness Ln
Longmeadow St
Berkshire Rd
Main St
Trafton Rd
Maple St
Dickinson St
Converse St
Tanglewood Dr
Park Dr
Pecousic Brook
Pontet Lake Dr
Sumner Ave
Forest Park
Cooley Brook
Laurel Park
Bliss Park

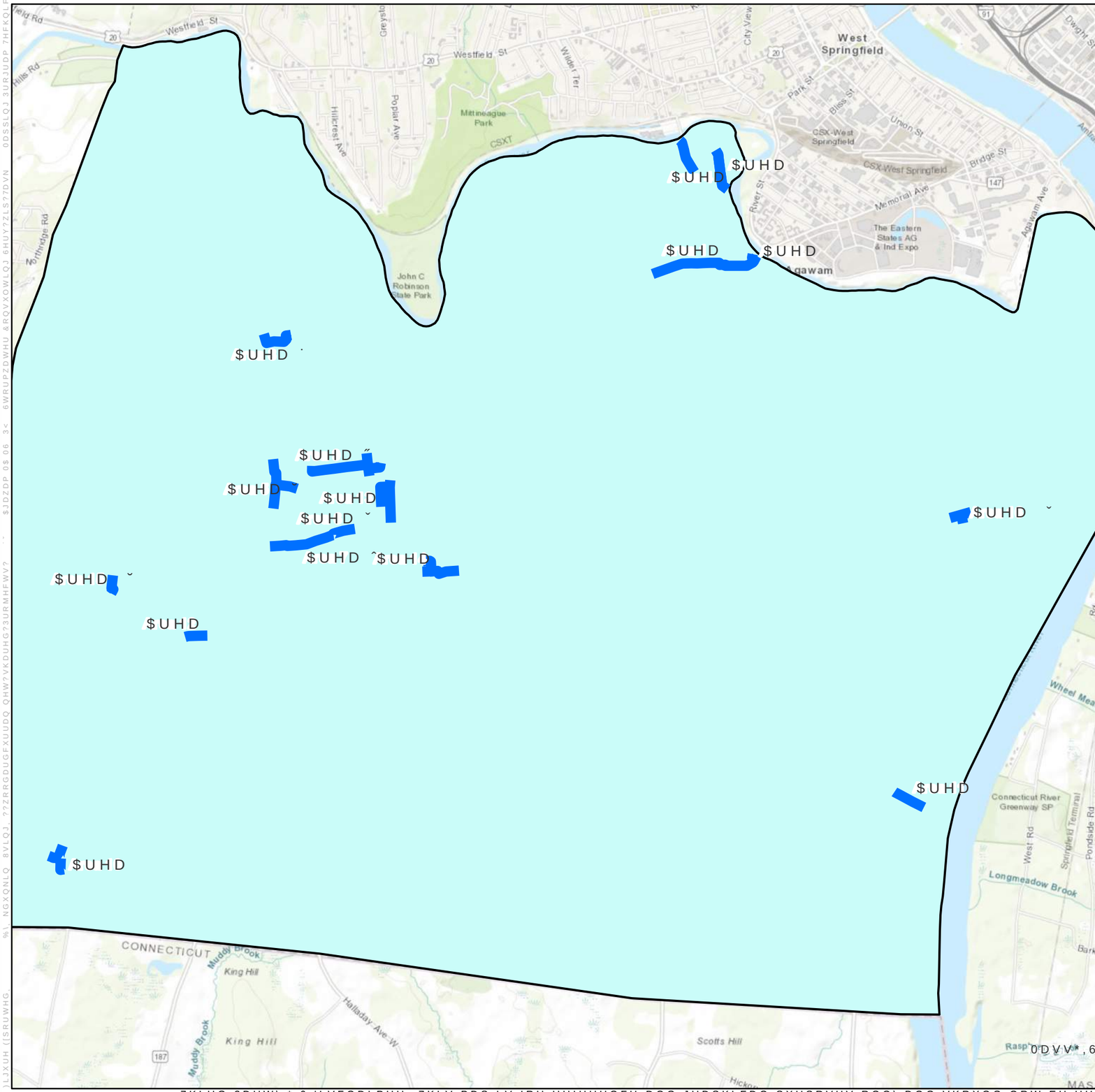

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Figure 5-2: H
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&RPSOHWHG &&79
6WRUP 'UDLQ 3LSH

)HHW
LQ IW

WOODARD &CURRAN

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3URMHFW
0DS &UHDWHG)HEUXD

7KLUG 3DUW\ *,6 'LVFODLPHU 7KLV PDS LV IRU UHIHUHQFH DQG JUDSKLFDO SXUSRVHV RQO\ DQG VKRXOG QRW EH UHOLHG XSRQ E\ WKLUGSDUW\ IRU DQ\ RIILFLDO SXUSRVH $Q\ UHOLDQFH XSRQ WKH

PACP Inspection Form - Header Section

General Information Red font fields = Mandatory, Black font fields = Optional

1. Surveyed by	2. Certificate No.		3. Reviewed by	4.Reviewer Certificate No.
5. Owner	6. Customer		7. P/O Number	8. Work Order Number
9. Media Label	10. Project	11. Date YYYYMMDD	12. Time HH:MM	13. Sheet Number
14. Weather	15. Pre-Cleaning	16. Date Cleaned YYYYMMDD	17. Flow Control	18. Purpose of Survey
19. Direction of Survey	20. Inspection Technology Used		21. Inspection Status	
22. Consequence of Failure		23. Pressure Value		

Location

24. Drainage Area	25. Pipe Segment Reference	26. Street (Name & Number)
27. City	28. Location Code	29. Location Details

Pipe

30. Pipe Use	31. Height (Diameter)	32. Width	33. Shape
34. Material	35. Lining Method	36. Coating Method	37. Pipe Joint Length
38. Total Length	39. Length Surveyed	40. Year Constructed YYYY	41. Year Renewed YYYY

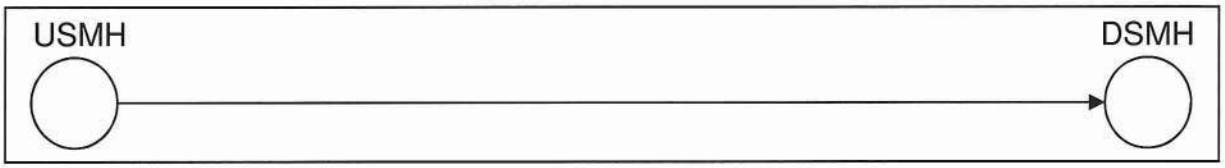
Measurements

42. Upstream MH No.	43. Upstrm MH Rim to Invert	44.Upstrm MH Rim to Grade	45.Upstrm MH Grade to Invert
46. Upstream MH Northing*	47. Upstream MH Easting*	48. Upstream MH Elevation**	
49.Downstream MH No.	50.Downstream MH Rim to Invert	51.Downstream MH Rim to Grade	
52. Downstream MH Grade to Invert	53. Downstream MH Northing*	54. Downstream MH Easting*	
55. Downstream MH Elevation**	56. MH Coordinate System*	57. MH Vertical Datum**	58. GPS Accuracy

59. Additional Information

*Entry required if Northing, Easting or Coordinate System data is recorded. **Entry required if Elevation or Vertical Datum data is recorded.

Sketch



Details Section

Distance (feet) (meters)	Video Ref.	Code Group/ Descriptor/ Modifier	Continuous Defect	Value Dimension 1st	Value Dimension 2nd	Value %	Joint	Circumferential Location At/From	Circumferential Location To	Image Ref.	Remarks

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Details Continuation Section

1. Surveyed by	5. Owner	11. Date	13. Sheet No.	42. Upstream MH No.	49. Downstream MH No.

Distance (feet) (meters)	Video Ref.	Code	Continuous Defect	Value			Joint	Circumferential Location		Image Ref.	Remarks
		Group/ Descriptor/ Modifier		Dimension		%		At/ From	To		
				1st	2nd						

Red font fields = Mandatory, Black font fields = Optional

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NASSCO'S PIPELINE ASSESSMENT CERTIFICATION PROGRAM® (PACP®)

Section 4 — Structural Defect Coding

C CRACK 4-3

CL Longitudinal
CC Circumferential
CM Multiple
CS Spiral
CH Hinge (2, 3, 4)

F FRACTURE 4-9

FL Longitudinal
FC Circumferential
FM Multiple
FS Spiral
FH Hinge (2, 3, 4)

B BROKEN 4-17

BSV Soil Visible
BVV Void Visible

H HOLE 4-21

HSV Soil Visible
HVV Void Visible

D DEFORMED (Rigid) 4-25

DR Deformed Rigid

No modifiers used.

D DEFORMED (Flexible) 4-25

DFBR Bulging Round
DFBI Bulging Inv.Curv.
DFC Creasing
DFE Elliptical

D DEFORMED (Brick) 4-25

DTBR Bulging Round
DTBI Bulging Inv.Curv.

X COLLAPSE 4-37

X Collapse

No descriptors and no modifiers used.

J JOINT 4-43

JOS Offset Small
JOM Offset Medium
JOL Offset Large

J JOINT 4-43

JOSD Offset Small Defect
JOMD Offset Medium Defect
JOLD Offset Large Defect

J JOINT 4-43

JSS Separation Small
JSM Separation Med.
JSL Separation Large

J JOINT 4-43

JAS Angular Small
JAM Angular Medium
JAL Angular Large

S SURFACE DAMAGE 4-51

SRI Roughness Increased
SAV Aggregate Visible
SAP Aggregate Projecting
SAM Aggregate Missing

S SURFACE DAMAGE 4-51

SRV Reinforcement Visible
SRP Reinforcemt.Projecting
SRC Reinforcemt.Corroded
SMW Missing Wall

S SURFACE DAMAGE 4-51

SSS Surface Spalling
SSC Surface Spalling Coating
SCP Chemical Attack
SZ Other

LF LINING FEATURES 4-67

LFAC Abdn'd Connection
LFAS Annular Space
LFB Blistered Lining
LFCS Service Cut Shifted

LF LINING FEATURES 4-67

LFD Detached
LFDC Discoloration
LFDE Defective End
LFDL Delamination

LF LINING FEATURES 4-67

LFOC Overcut Service
LFRS Resin Slug
LFUC Undercut Service
LFW Wrinkled
LFZ Other

WF WELD FAILURE 4-85

WFC Circumferential
WFL Longitudinal
WFM Multiple
WFS Spiral
WFZ Other

RP POINT REPAIR 4-89

RPL Liner
RPLD Liner Defective
RPP Patch
RPPD Patch Defective

RP POINT REPAIR 4-89

RPR Replacement
RPRD Replmt. Defective
RPZ Other
RPZD Other Defective

BRICKWORK 4-97

DB Displaced
MB Missing
DI Dropped Invert

BRICKWORK 4-97

MMS Mortar Missing Small
MMM Mortar Missing Med.
MML Mortar Missing Large

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Section 5 — Operation and Maintenance

D DEPOSITS (Attached) 5-3

DAE Encrustation
DAGS Grease
DAR Ragging
DAZ Other

D DEPOSITS (Settled) 5-4

DSF Fine
DSGV Gravel
DSC Hard/Compact
DSZ Other

D DEPOSITS (Ingress) 5-4

DNF Fine (silt/sand)
DNGV Gravel
DNZ Other

R ROOTS (Fine) 5-11

RFB Barrel
RFL Lateral
RFC Connection
RFJ Joint

R ROOTS (Medium) 5-11

RMB Barrel
RML Lateral
RMC Connection
RMJ Joint

R ROOTS (Ball) 5-11

RBB Barrel
RBL Lateral
RBC Connection
RBJ Joint

R ROOTS (Tap) 5-11

RTB Barrel
RTL Lateral
RTC Connection
RTJ Joint

I INFILTRATION 5-19

IS Stain
ISB Barrel
ISC Connection
ISJ Joint
ISL Lateral

I INFILTRATION 5-19

IW Weeper
IWB Barrel
IWC Connection
IWJ Joint
IWL Lateral

I INFILTRATION 5-19

ID Dripper
IDB Barrel
IDC Connection
IDJ Joint
IDL Lateral

I INFILTRATION 5-19

IR Runner
IRB Barrel
IRC Connection
IRJ Joint
IRL Lateral

I INFILTRATION 5-19

IG Gusher
IGB Barrel
IGC Connection
IGJ Joint
IGL Lateral

OB OBSTACLES 5-31 OBSTRUCTIONS

OBB Brick or Masonry
OBC Object Through Connection
OBI Object Intruding Through Wall

OB OBSTACLES 5-31 OBSTRUCTIONS

OBJ Object in Joint
OBM Pipe Material in Invert
OBN Construction Debris
OBP External Pipe Cable

OB OBSTACLES 5-31 OBSTRUCTIONS

OBR Rocks
OBS Built In Structure
OBZ Other

V VERMIN 5-45

VR Rat
VC Cockroach
VZ Other

G GROUT TEST & SEAL 5-49

GTP Grout Test Passed
GTPJ Joint
GTPL Lateral
GTF Grout Test Failed
GTFJ Joint
GTFL Lateral

G GROUT TEST & SEAL 5-49

GTU Grout Test Unable
GTUJ Joint
GTUL Lateral
GRT Grout Test Location

Section 6 — Construction Features

T TAP 6-3

TB Break-In/Hammer
TBI Intruding
TBD Defective
TBC Capped
TBA Activity
TBB Abandoned

T TAP 6-3

TF Factory Made
TFI Intruding
TFD Defective
TFC Capped
TFA Activity
TFB Abandoned

T TAP 6-3

TR Rehabilitated
TRI Intruding
TRD Defective
TRC Capped
TRA Activity
TRB Abandoned

T TAP 6-3

TS Saddle
TSI Intruding
TSD Defective
TSC Capped
TSA Activity
TSB Abandoned

IS INTRUDING SEALING MATERIAL 6-15

ISSR Sealing Ring
ISSRB Broken
ISSRH Hanging
ISSRL Loose
ISGT Grout
ISZ Other

L LINE (of sewer) 6-21

LD Down
LL Left
LLD Left Down
LLU Left Up

L LINE (of sewer) 6-21

LR Right
LRD Right Down
LRU Right Up
LU Up

A ACCESS POINT 6-25

ACB Catch Basin
ACO Cleanout
ACOM Mainline
ACOP Property
ACOH House

A ACCESS POINT 6-25

ADP Discharge Point
AEP End of Pipe
AJB Junction Box
AM Meter
AMH Manhole

A ACCESS POINT 6-25

AOC Other Structure
ATC Tee Connection
AWA Wastewater Access
AWW Wetwell
AZ Other

Section 7 — Miscellaneous Features

M 7-1 MISCELLANEOUS FEATURES

MCU Camera Underwater
MGO General Observation
MGP General Photograph
MJL Joint Length

M 7-1 MISCELLANEOUS FEATURES

MLC Lining Change
MMC Material Change
MSC Shape/Size Change
MSA Survey Abandoned
MWL Water Level

M 7-1 MISCELLANEOUS FEATURES

MWLS Water Level Sag
MWM Water Mark
MY Dye Test
MYV Dye Visible
MYN Not Visible

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Section 2 — Header Form Fields

14 Weather 2-5

1 = Dry
2 = Heavy Rain
3 = Light Rain
4 = Snow
5 = Dry Weather/Wet Ground

15 Pre-Cleaning 2-5

H = Heavy Cleaning
L = Light Cleaning (Jetting)
N = No Pre-Cleaning
X = Not Known
Z = Other

17 Flow Control 2-6

B = Bypassed
D = Dewatered Using Jetter
L = Lift Station
N = Not Controlled
P = Plugged

18 Purpose 2-7

A = Maintenance
B = Infiltration/Inflow Invest.
C = Post-Rehabilitation
D = Pre-Rehabilitation
E = Pre-Acceptance
F = Routine Assessment

18 Purpose 2-7

G = Capital Improvement Program Assessment
H = Resurvey
I = SSES
R = Pre-Existing Video
X = Not Known

19 Direction 2-7

D = Downstream
U = Upstream

20 Inspection Technology 2-8

CC = CCTV
LA = Laser
SO = Sonar
SS = Sidewall Scanning
ZM = Zoom
ZZ = Other

21 Inspection Status 2-8

BM = Buried & Marked
CI = Complete Inspection
NA = No Access
NE = Does Not Exist

21 Inspection Status 2-8

NF = Not Found
NI = Traffic
NO = Not Opened
SD = Surcharged/Debris

28 Location Code 2-11

A = Primary Major Arterial Road
B = Secondary Road
C = Local/Rural Street
D = Easement/Right-of-Way
E = Woods

28 Location Code 2-11

F = Sidewalk
G = Parking Lot
H = Alley
I = Ditch
J = Building
K = Creek (or any waterway)

28 Location Code 2-11

L = Railway
M = Airport
N = Levee/Floodwall
O = Dam
P = Levee Pump Station
Y = Yard
Z = Other

30 Pipe Use 2-12

CB = Combined Pipe
DP = Dam Pipe
FM = Force Main
LG = Levee Gravity Pipe
LP = Levee Pressure Pipe

30 Pipe Use 2-12

PR = Process Pipe
SS = Sanitary Sewage Pipe
SW = Stormwater Pipe
XX = Not Known
ZZ = Other

33 Shape 2-13 E-1

A = Arched
B = Barrel
C = Circular
E = Egg-Shaped
H = Horseshoe
O = Oval (elliptical)

33 Shape 2-13 E-1

R = Rectangular
S = Square
T = Trapezoidal
U = U-Shaped with Flat Top
Z = Other

34 Material 2-14 E-4

ABS = Acrylonitrile Butadiene Styrene
AC = Asbestos Cement
BR = Brick
CAS = Cast Iron
CLC = Clay-Lined Concrete
CMP = Corrugated Metal Pipe

34 Material 2-14 E-4

CP = Concrete Pipe
CSB = Conc. Segments Bolted
CSU = Conc. Segments Unbolted
CT = Clay Tile
DIP = Ductile Iron Pipe

34 Material 2-14 E-4

FRP = Fiberglass Reinforced Pipe
OB = Orangeburg/Pitch Fiber
PCCP = Pre-Stressed Concrete Cylinder Pipe
PCP = Polymer Concrete Pipe
PE = Polvethvlene

34 Material 2-14 E-4

PP = Polypropylene
PSC = Plastic/Steel Composite
PVC = Polyvinyl Chloride
RCP = Reinf. Concrete Pipe
RMP = Reinf. Plastic Pipe
SB = Segmented Block

34 Material 2-14 E-4

SP = Steel Pipe
VCP = Vitrified Clay Pipe
WD = Wood
XXX = Not Known
ZZZ = Other

35 Lining Method 2-15 E-17

CIP = Cured-In-Place Pipe
FF = Fold and Form
FP = Formed-In-Place Liner
GP = Grout-In-Place Liner
GRC = Glass Reinf. Cement
N = None
SC = Continuous Slip Liner

35 Lining Method 2-15 E-17

SE = Sectional Slip Liner
SL = Spray Liner
SN = Segmented Panel
SP = Segmented Pipe
SW = Spiral Wound
XX = Not Known
ZZ = Other

36 Coating Method 2-16 E-23

CT = Coal Tar
CM = Cement Mortar
EP = Epoxy
PE = Polyethylene

36 Coating Method 2-16 E-23

PO = Polyurethane
PU = Polyurea
PVC = Polyvinyl Chloride
XX = Not Known
ZZ = Other

58 GPS Accuracy 2-27

L = Survey Level
M = Sub-Meter
N = Nearest Meter

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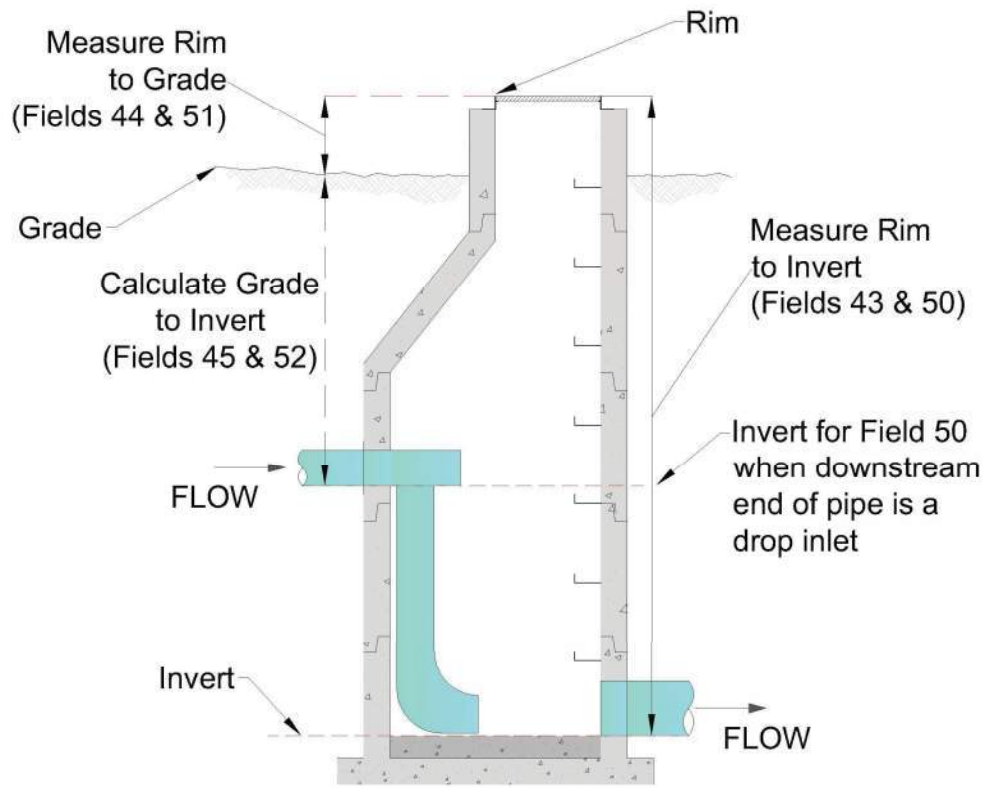

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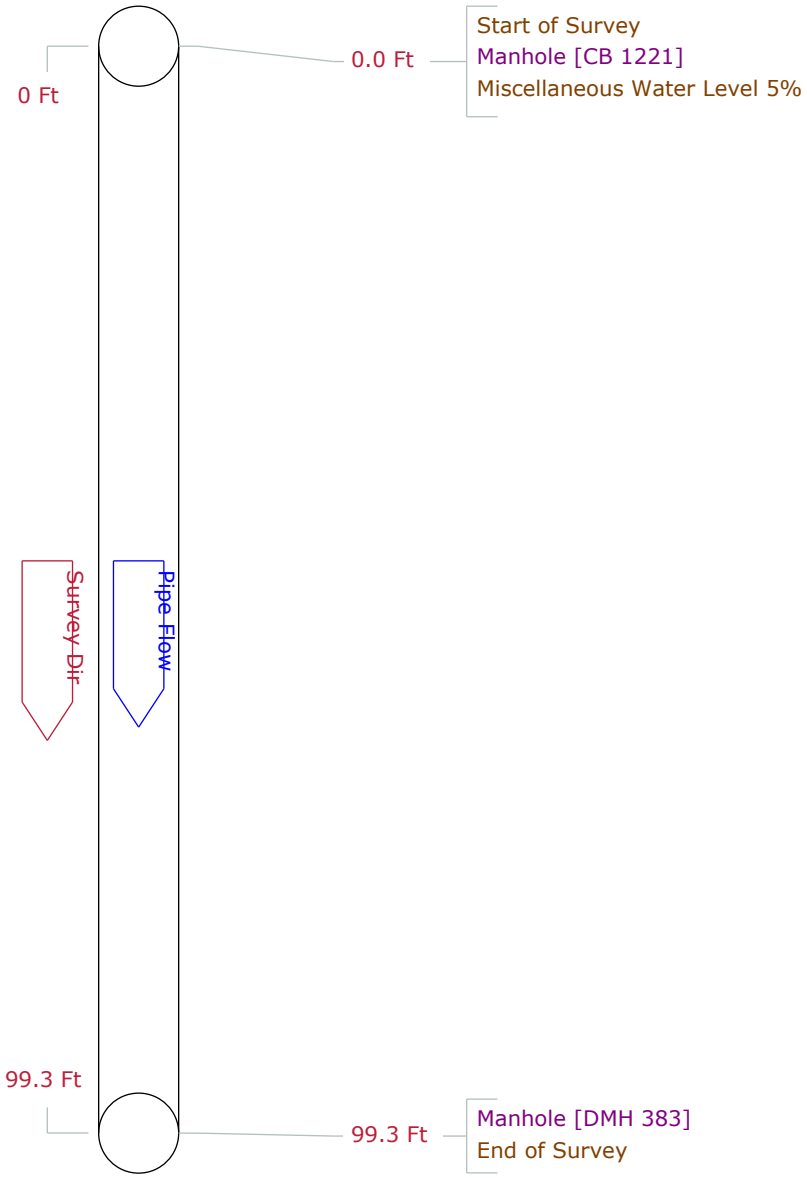
Pipe Graphic Report of PLR CB 1221 X for Woodard and Curran

Setup	71	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/15	**Time**	11:06	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Thalia Dr.	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	24	**Width**	ins
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	99.3 Ft
Length Surveyed	99.30 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	CB 1221	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 383	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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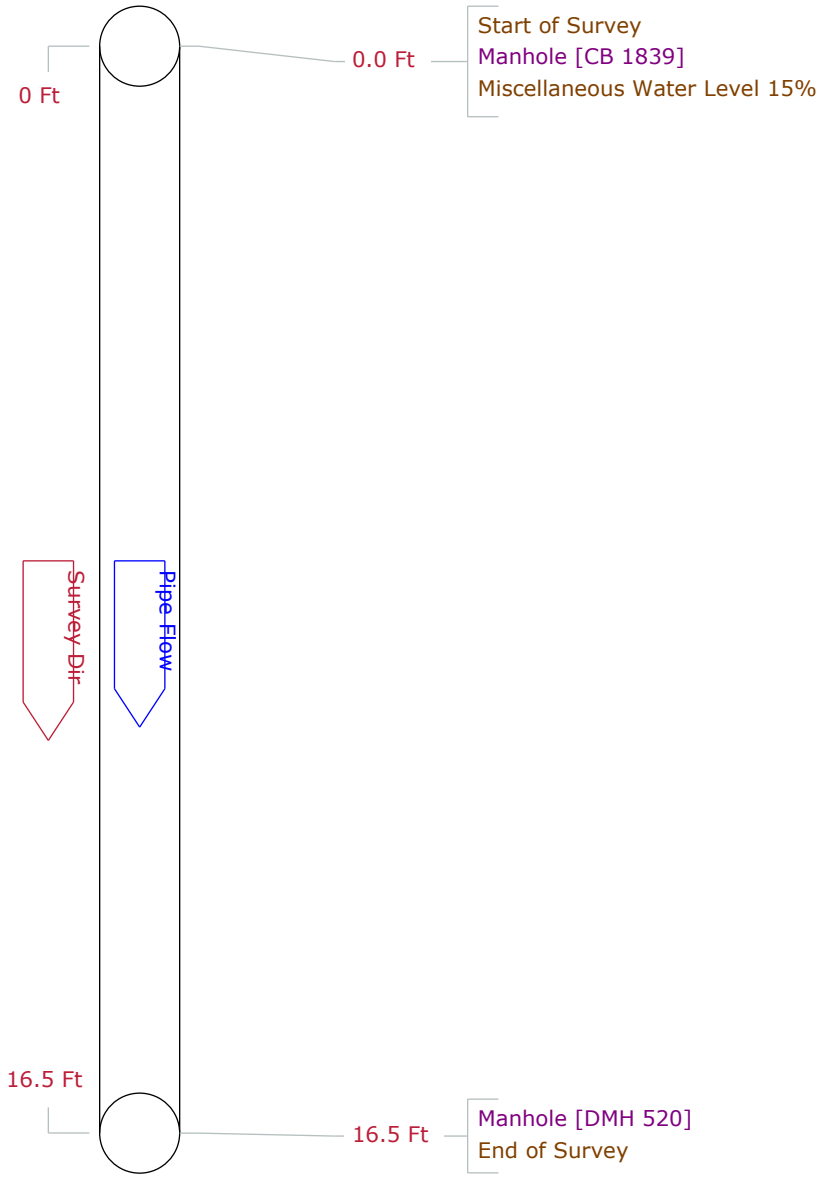
Pipe Graphic Report of PLR CB 1839 X for Woodard and Curran

Setup	39	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/12	**Time**	10:26	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	North Westfield St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	30
Width		**ins**			
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	16.5 **Ft**
Length Surveyed	16.50 **Ft**	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	CB 1839	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 520	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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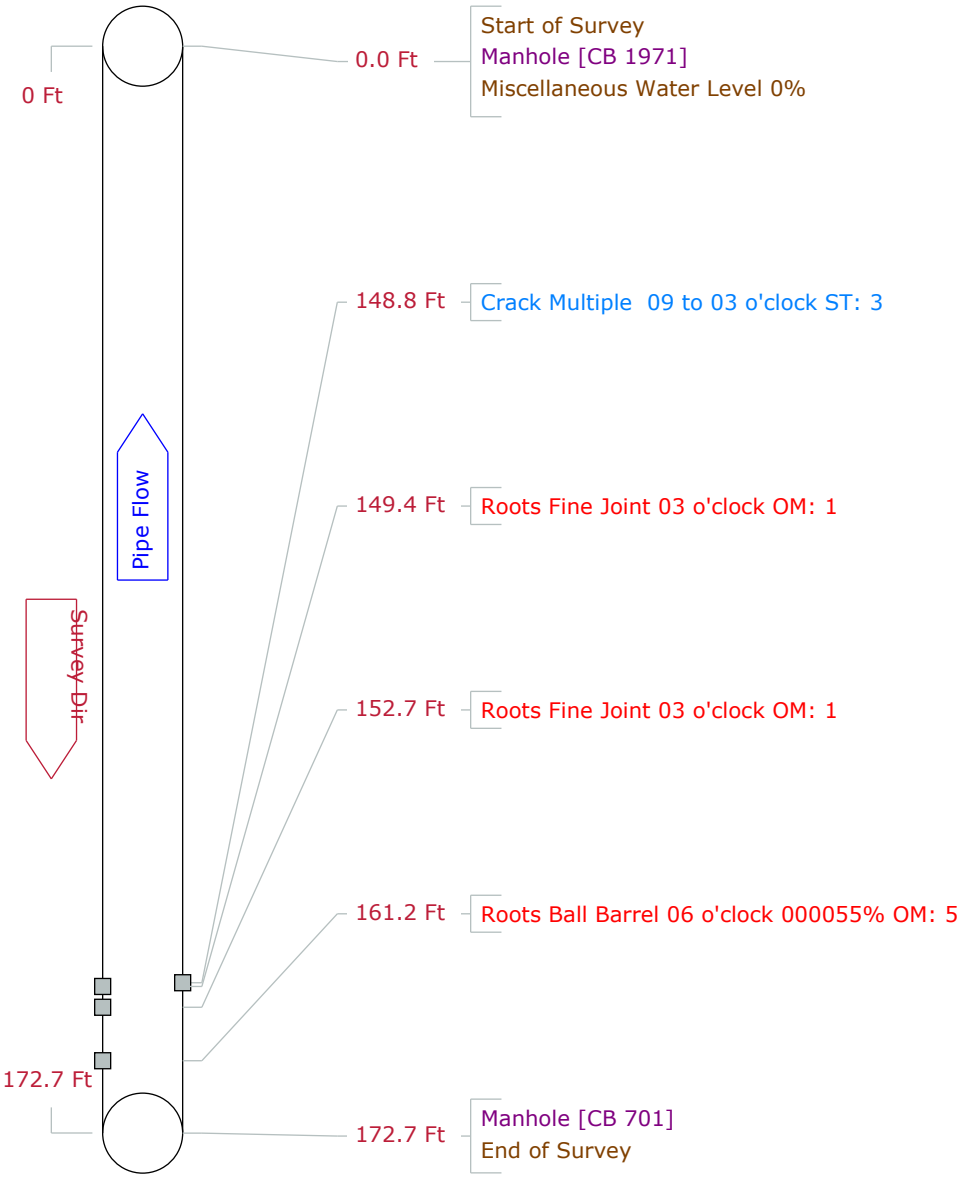
Pipe Graphic Report of PLR CB 701 X for Woodard and Curran

Setup	97	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/21	**Time**	9:54	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	Depalma St.	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	10	**Width**	ins
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	172.7 Ft
Length Surveyed	172.70 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M
Miscellaneous	Constructional

Up	CB 701	**Rim to invert**		**Grade to invert**	**Rim to grade** Ft
Down	CB 1971	**Rim to invert**		**Grade to invert**	**Rim to grade** Ft



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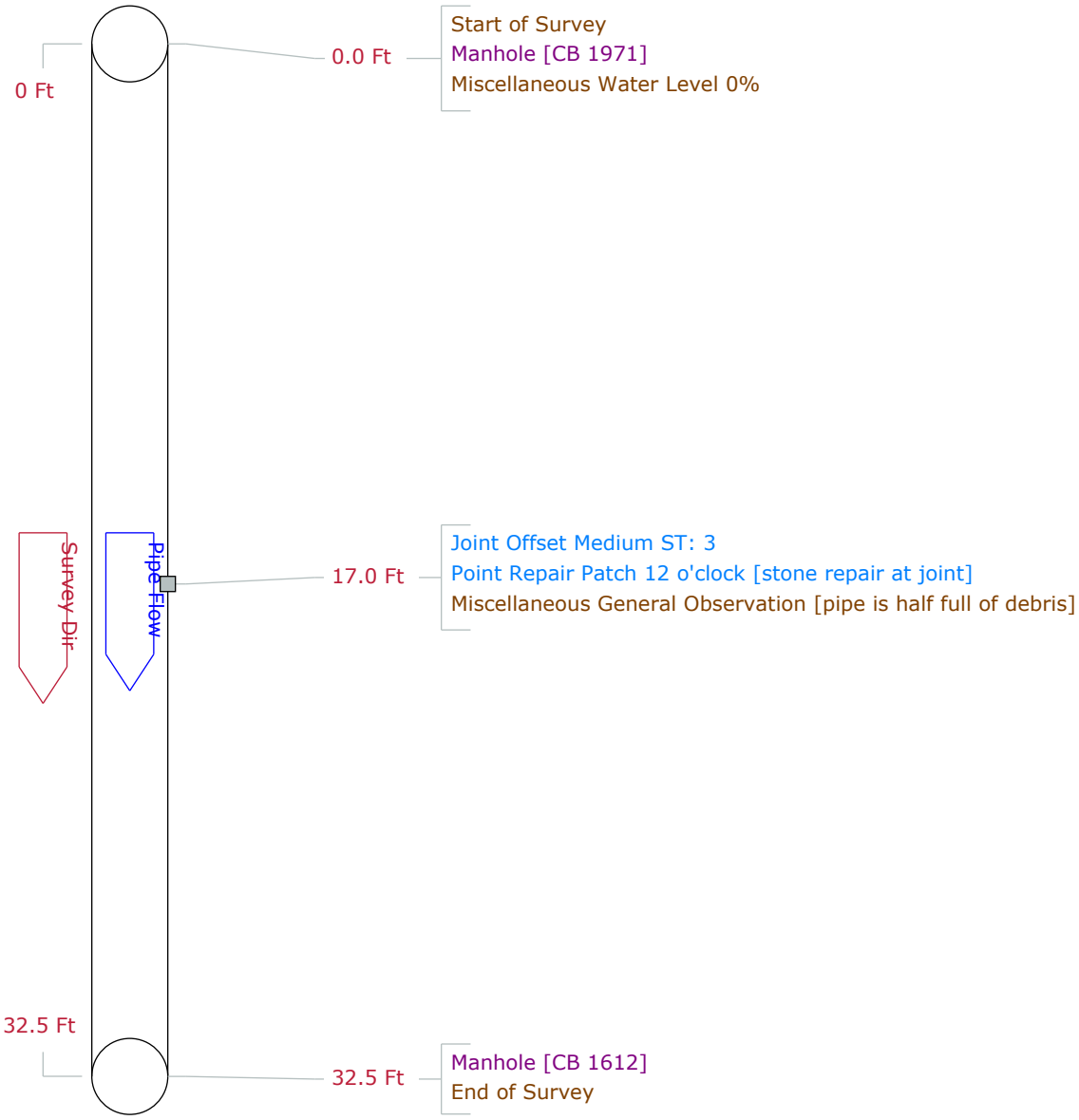
Pipe Graphic Report of PLR CB 1971 X for Woodard and Curran

Setup	96	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/21	**Time**	9:13	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Depalma St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	10
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	32.5 Ft
Length Surveyed	32.50 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	CB 1971	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	CB 1612	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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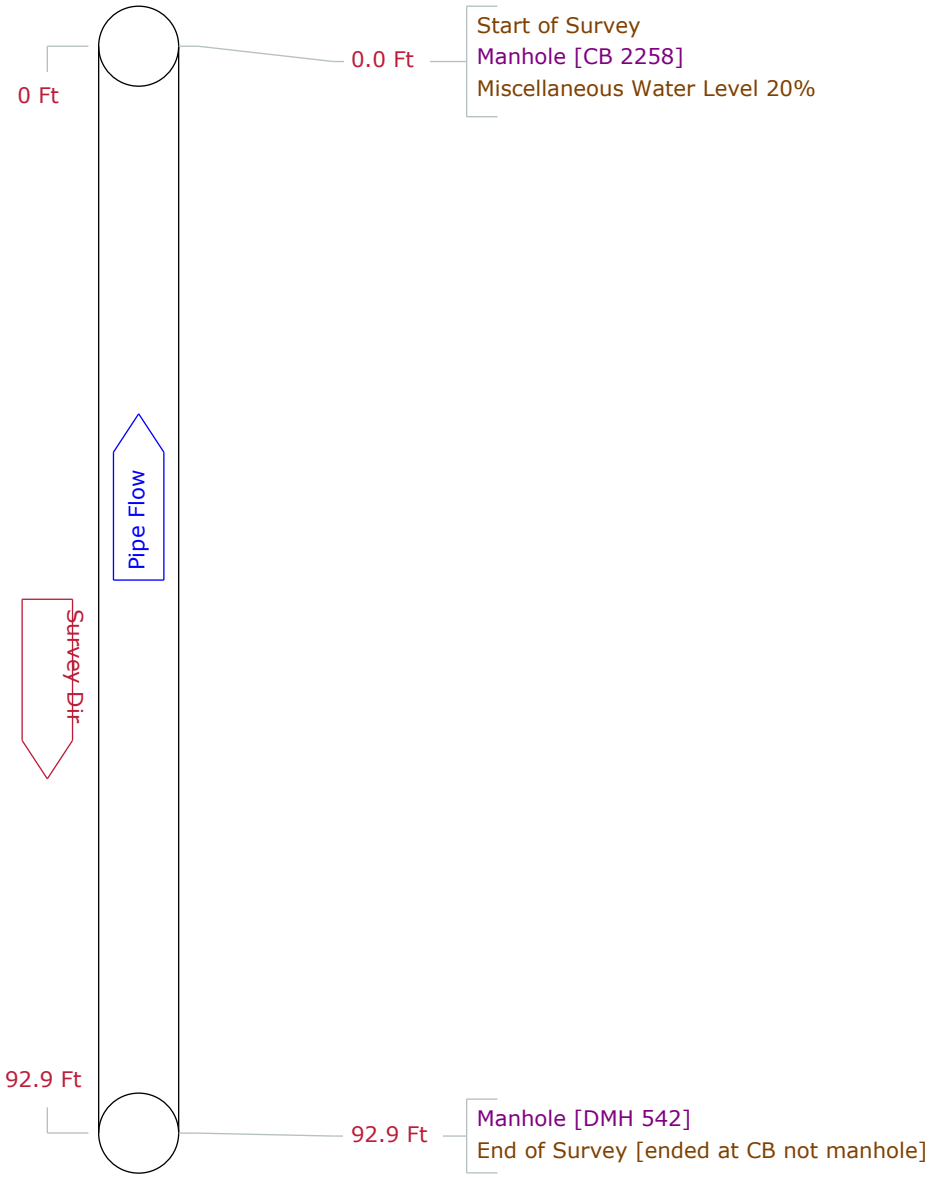
Pipe Graphic Report of PLR DMH 542 X for Woodard and Curran

Setup	93	**Surveyed By**	ZC	**Certificate #**	614-06021733	**Owner**	
Reviewed By		**Reviewer #**		**Work Order**			
Customer				**P/O #**			
Media Label		**Project**	Agawam Storm Drain CCTV Investigation				
Date	2021/01/20	**Time**	13:13	**Weather**		**Pre-Cleaning**	N
Date Cleaned							
Flow control		**Survey Purpose**				**Direction**	Upstream
Street	Memorial Park			**City**	Agawam	**Drainage area**	
Location Code						**Pipe Use**	Stormwater Pipe
Location details						**Height**	18
Width	ins						
Shape	Circular			**Material**	Vitrified Clay Pipe	**Lining**	
Coating				**Pipe Joint length**	Ft	**Total length**	92.9 Ft
Length Surveyed	92.90 Ft	**Year Constructed**		**Year Renewed**			

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 542	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	CB 2258	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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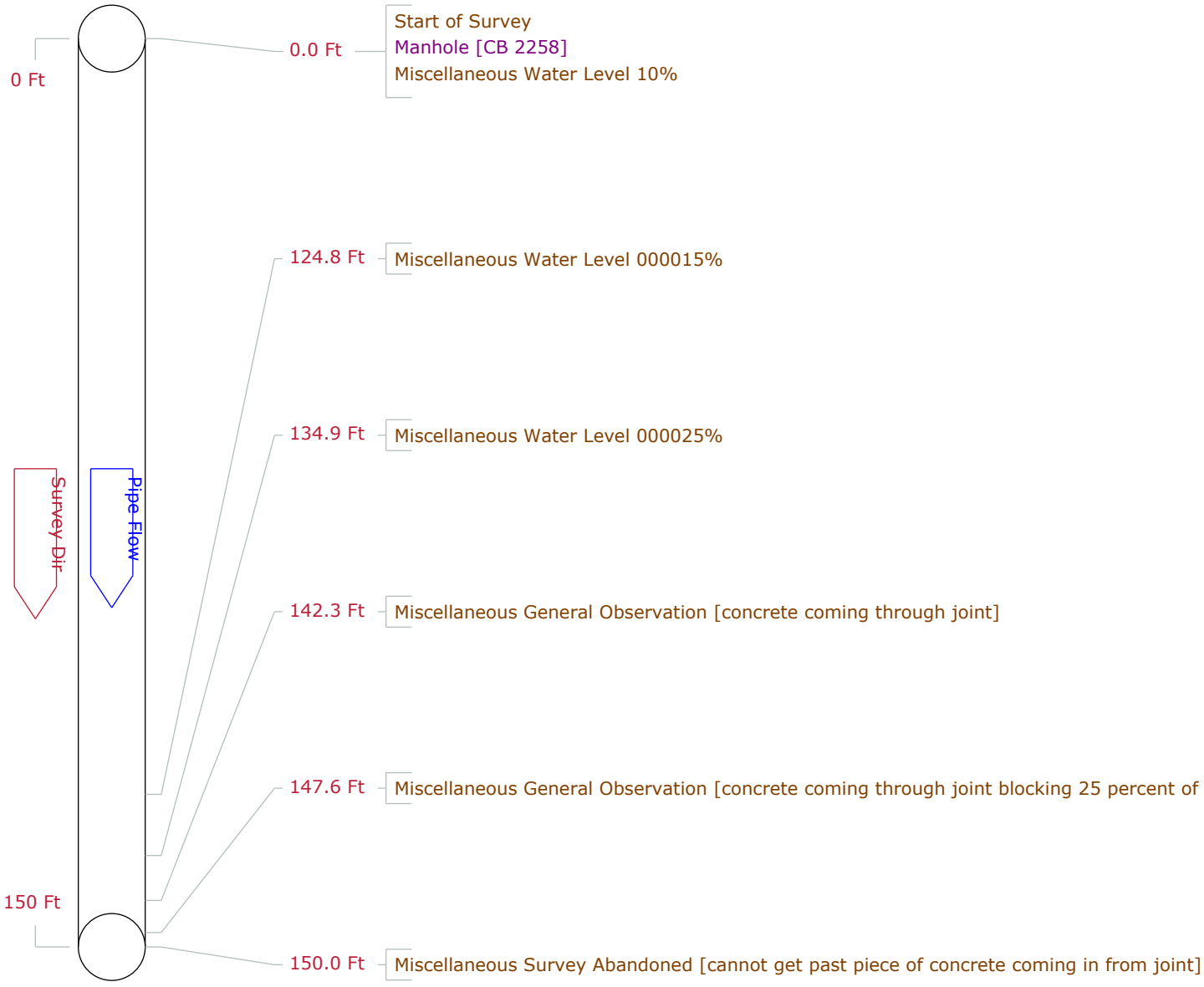
Pipe Graphic Report of PLR CB 2258 X for Woodard and Curran

Setup	92	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/20	**Time**	12:25	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Memorial Park	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	18
Width	ins				
Shape	Circular	**Material**	Vitrified Clay Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	Ft
Length Surveyed	150.00 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	CB 2258	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	TM 20 293	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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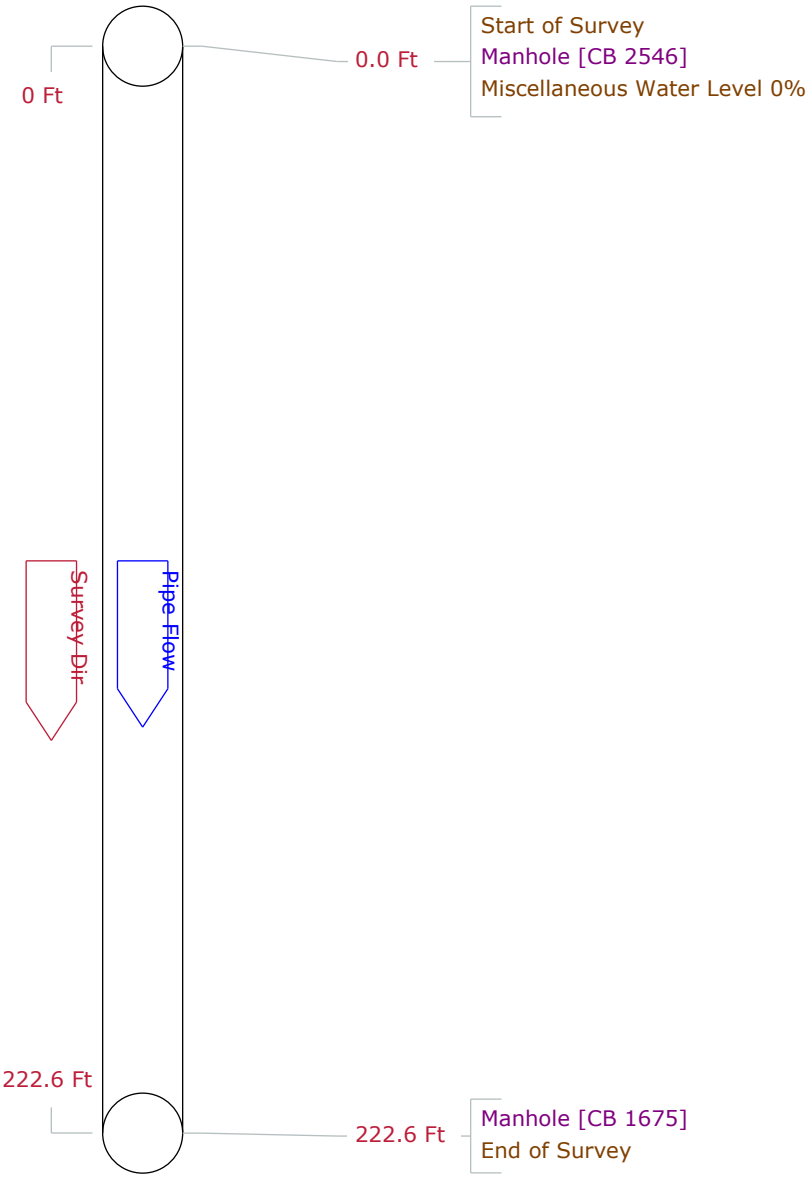
Pipe Graphic Report of PLR CB 2546 X for Woodard and Curran

Setup	90	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/20	**Time**	10:44	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Belvidere Ave	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	12
Width	ins				
Shape	Circular	**Material**	Vitrified Clay Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	222.6 Ft
Length Surveyed	222.60 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	CB 2546	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	CB 1675	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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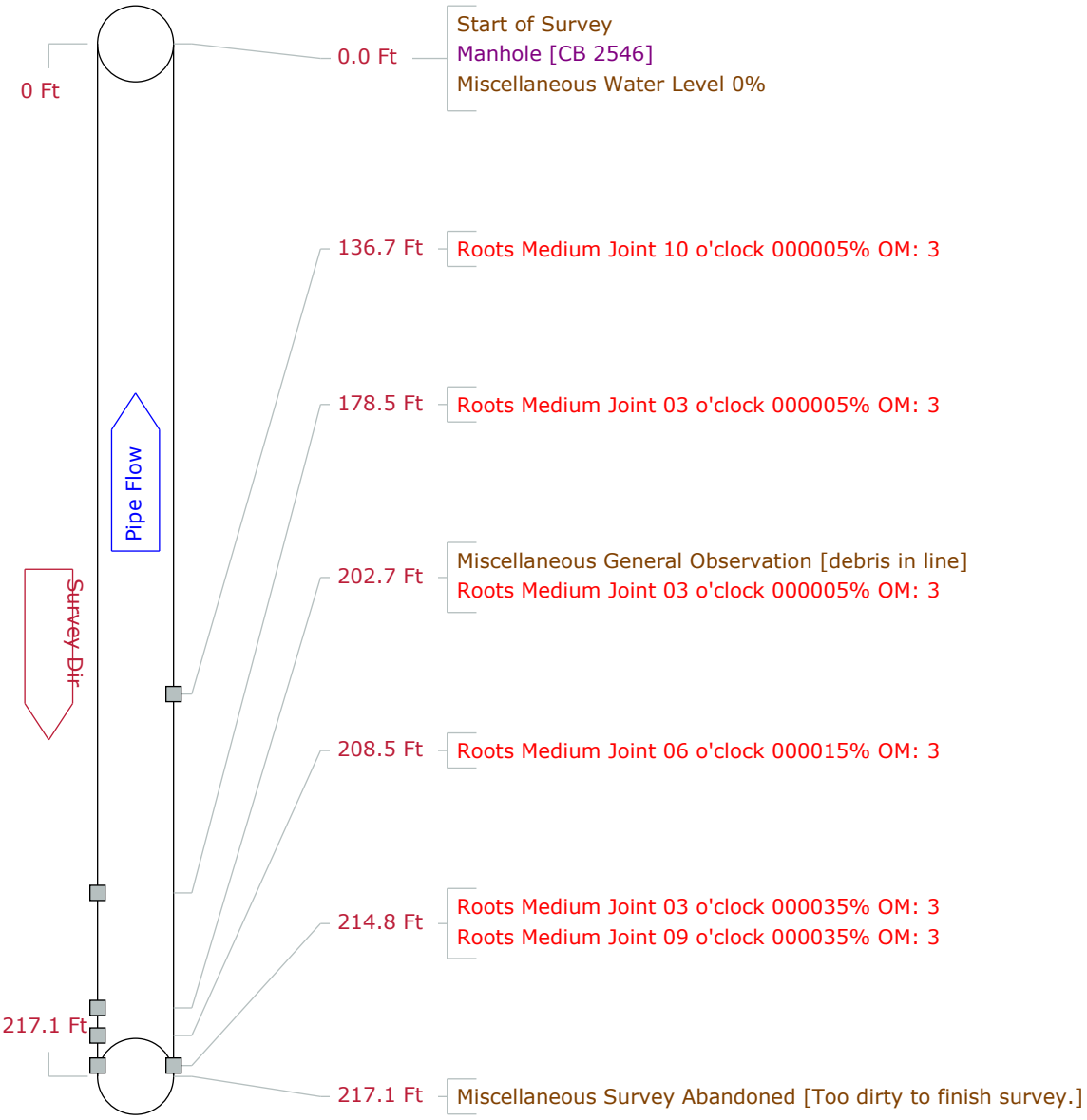
Pipe Graphic Report of PLR CB 2545 X for Woodard and Curran

Setup	91	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/20	**Time**	11:13	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	Belvidere Ave	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	12	**Width**	ins
Shape	Circular	**Material**	Vitrified Clay Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	Ft
Length Surveyed	217.10 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	CB 2545	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	CB 2546	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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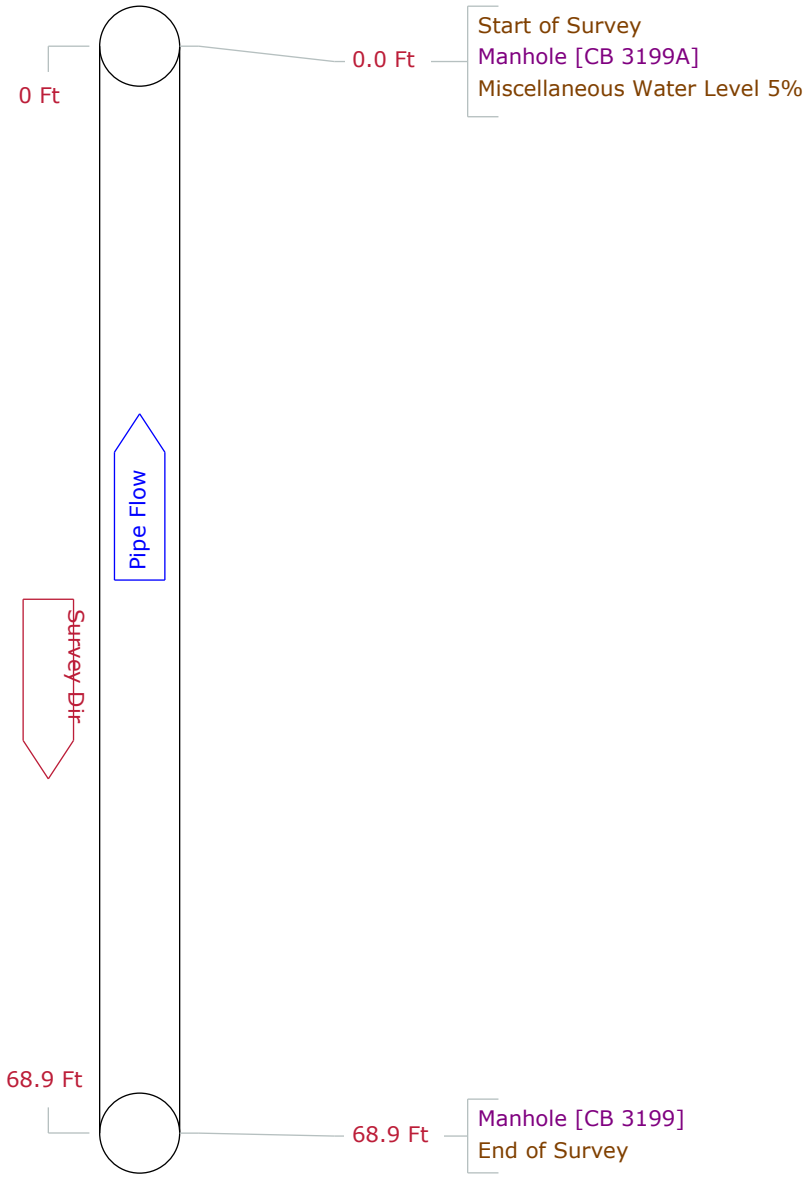
Pipe Graphic Report of PLR CB 3199 X for Woodard and Curran

Setup	67	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/15	**Time**	8:13	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	School St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	12
Width	ins				
Shape	Circular	**Material**	Vitrified Clay Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	68.9 Ft
Length Surveyed	68.90 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	CB 3199	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	CB 3199A	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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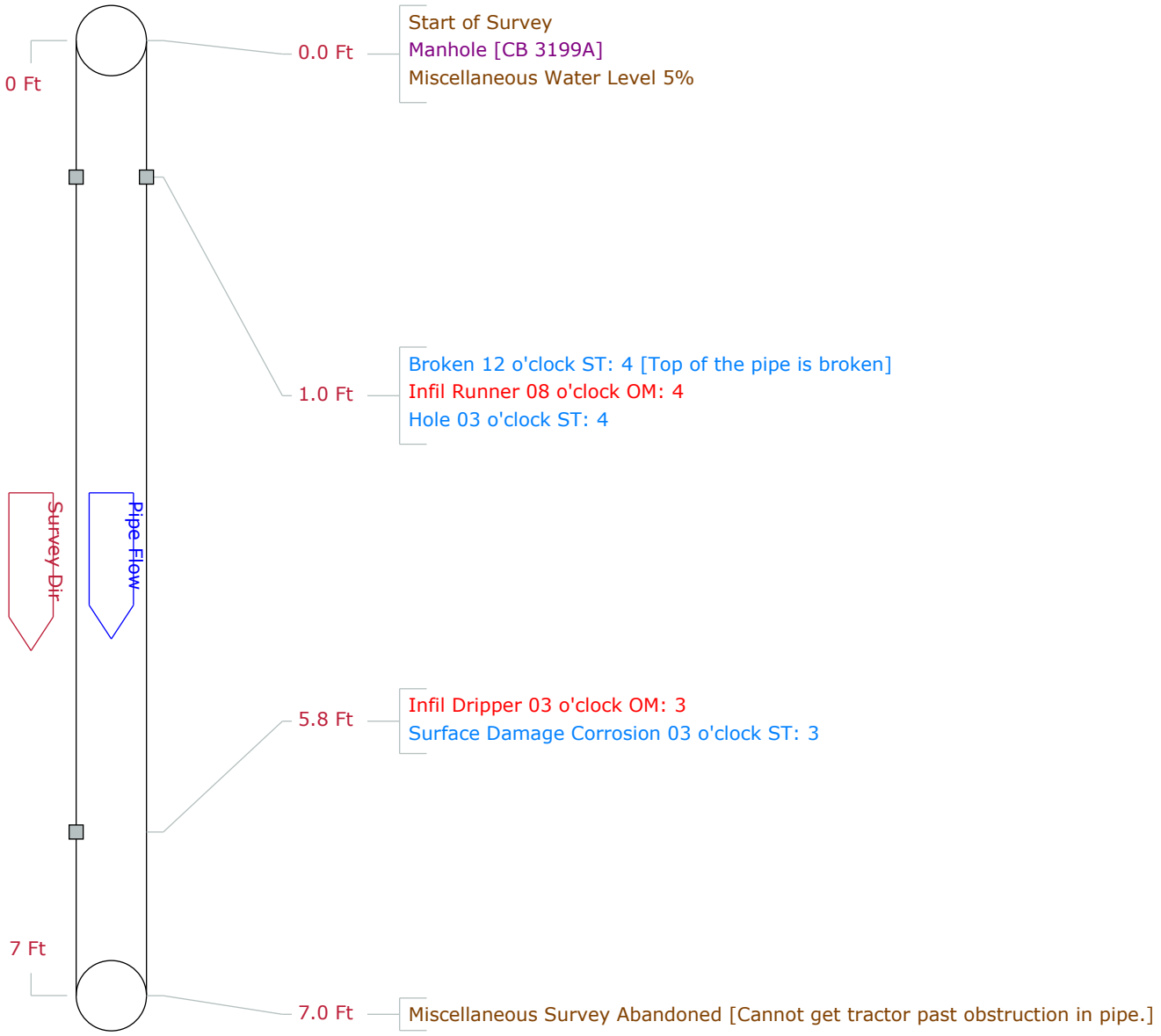
Pipe Graphic Report of PLR CB 3199A X for Woodard and Curran

Setup 66	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/15	**Time** 7:48	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street School St.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height** 15	**Width** ins
Shape Circular		**Material** Corrugated Metal Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** Ft	Structural	O & M
Length Surveyed 07.00 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up	CB 3199A	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	UN 56 955	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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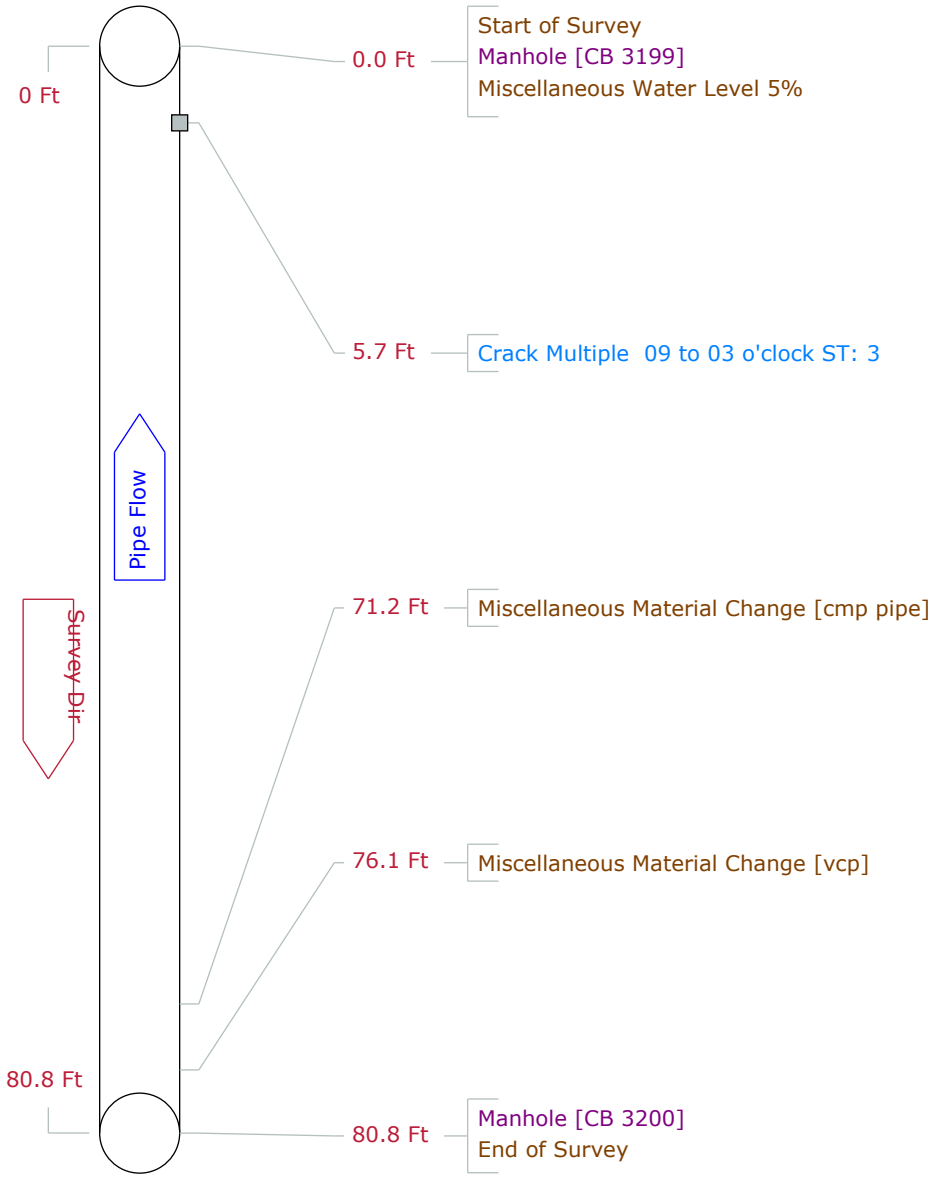
Pipe Graphic Report of PLR CB 3200 X for Woodard and Curran

Setup 69	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/15	**Time** 8:59	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Upstream
Street School St.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 15	**Width** ins
Shape Circular		**Material** Vitrified Clay Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 80.8 Ft	Structural	O & M
Length Surveyed 80.80 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up	CB 3200	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	CB 3199	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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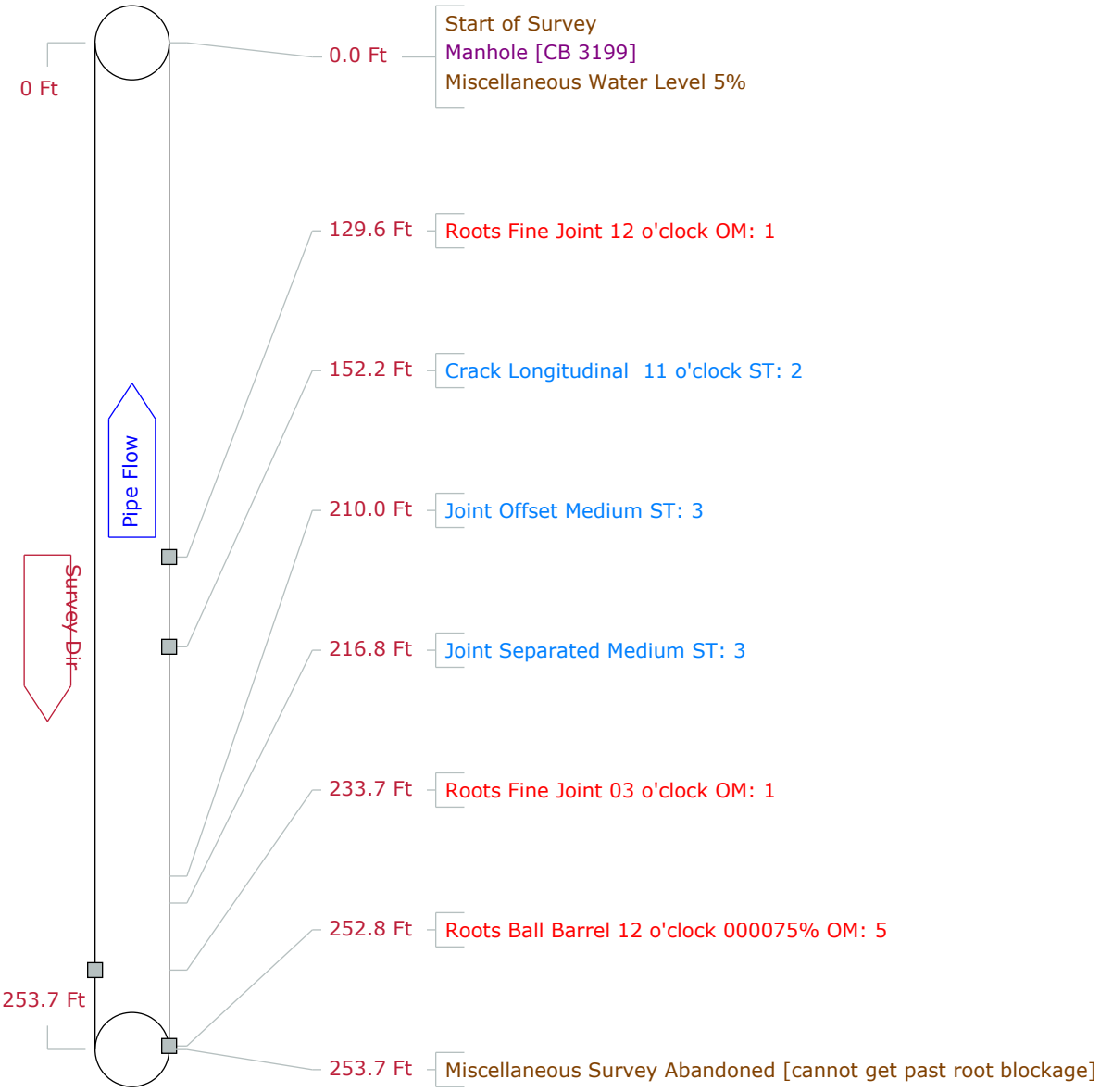
Pipe Graphic Report of PLR DMH 1299 X for Woodard and Curran

Setup	68	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/15	**Time**	8:41	**Weather**	
Pre-Cleaning	N	**Date Cleaned**		**Flow control**	
Survey Purpose		**Direction**	Upstream		
Street	School St.	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	15	**Width**	ins
Shape	Circular	**Material**	Vitrified Clay Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	Ft
Length Surveyed	253.70 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 1299	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	CB 3199	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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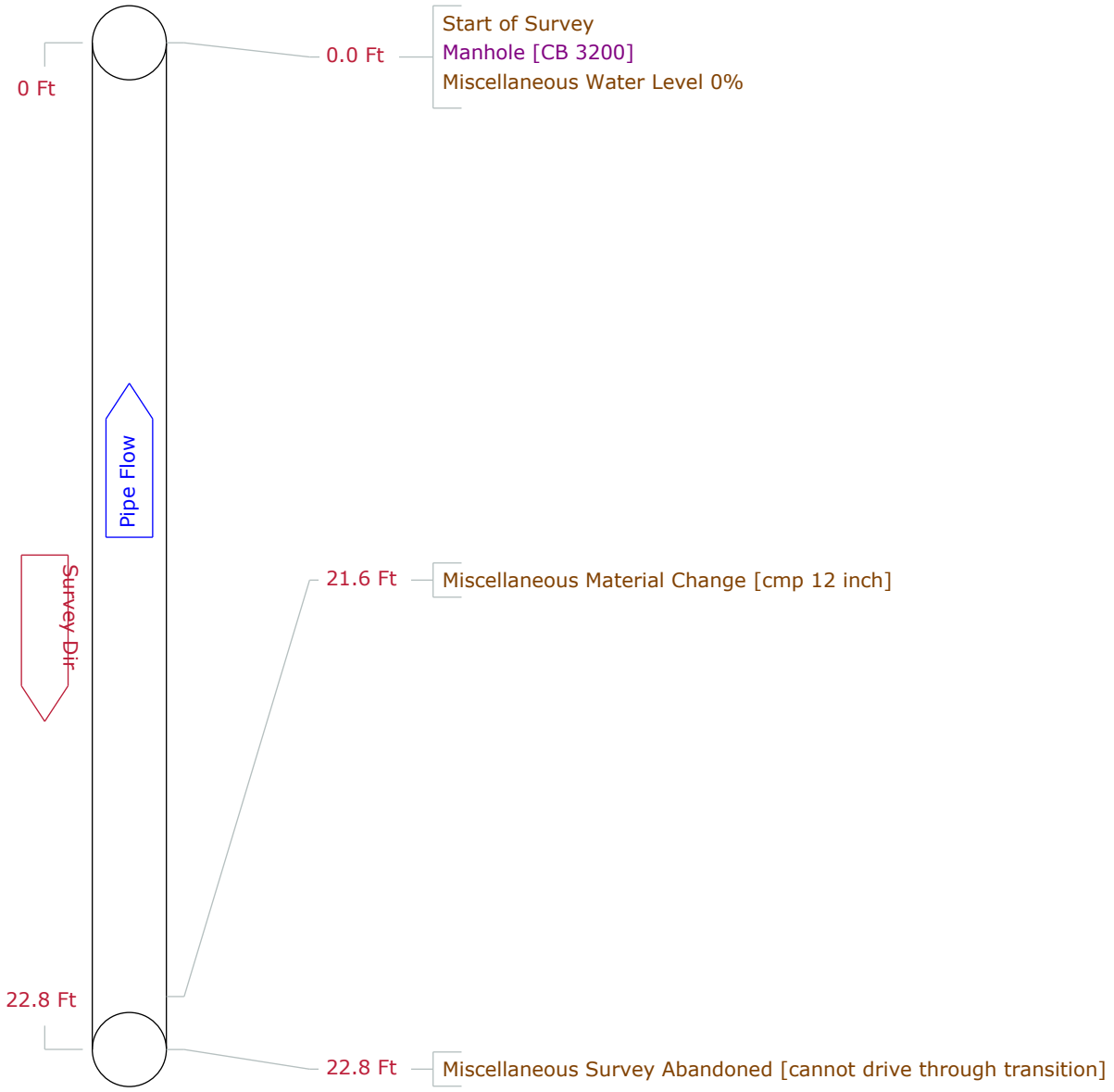
Pipe Graphic Report of PLR CB 3203 X for Woodard and Curran

Setup	70	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/15	**Time**	9:04	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	School St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	15
Width		**ins**			
Shape	Circular	**Material**	Vitrified Clay Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	**Ft**
Length Surveyed	22.80 **Ft**	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	CB 3203	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	CB 3200	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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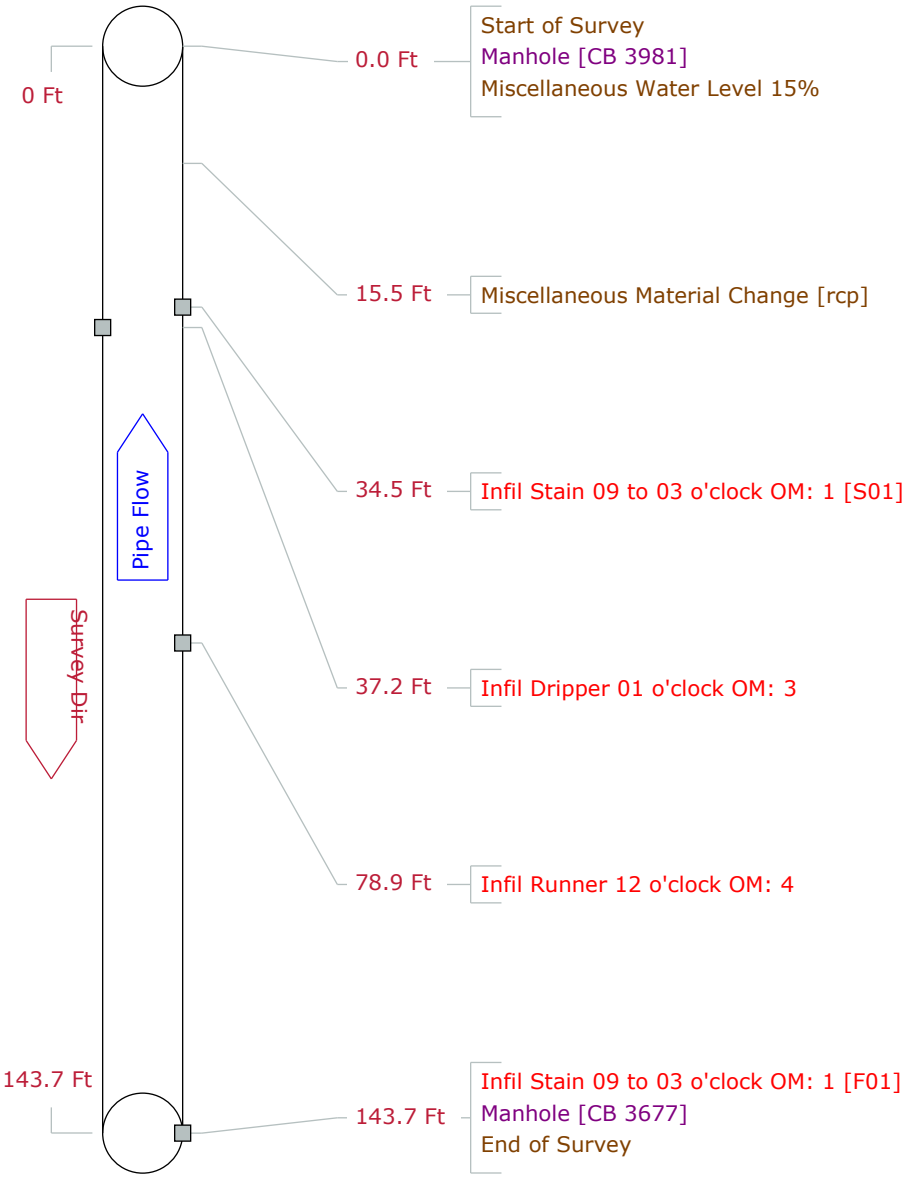
Pipe Graphic Report of PLR CB 3677 X for Woodard and Curran

Setup	25	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/07	**Time**	11:22	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	Springfield St	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	36	**Width**	ins
Shape	Circular	**Material**	Corrugated Metal Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	143.7 Ft
Length Surveyed	143.70 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	CB 3677	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	CB 3981	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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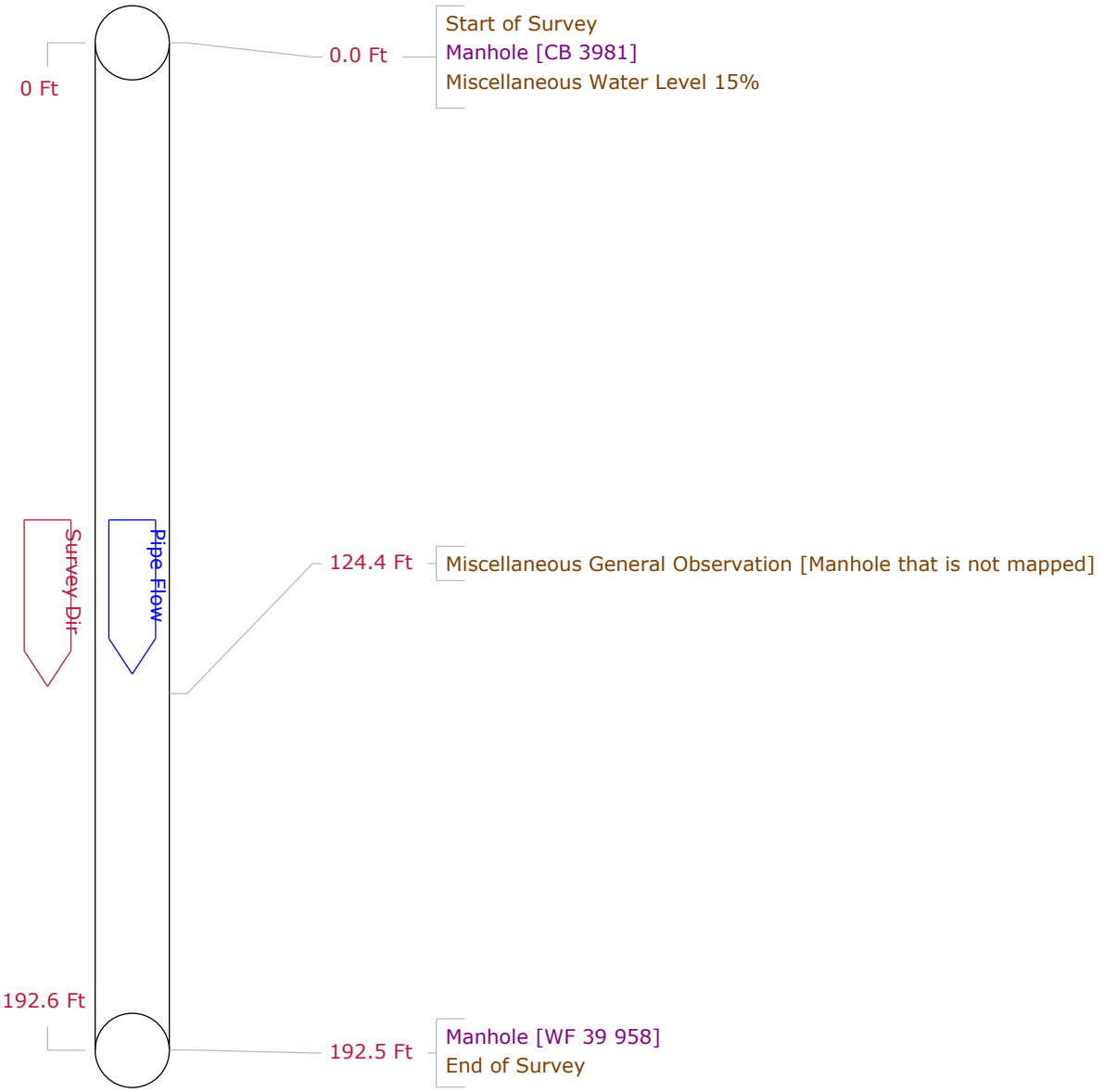
Pipe Graphic Report of PLR CB 3981 X for Woodard and Curran

Setup	24	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/07	**Time**	10:47	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Springfield St	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	36
Width	ins				
Shape	Circular	**Material**	Corrugated Metal Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	192.6 Ft
Length Surveyed	192.50 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	CB 3981	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	WF 39 958	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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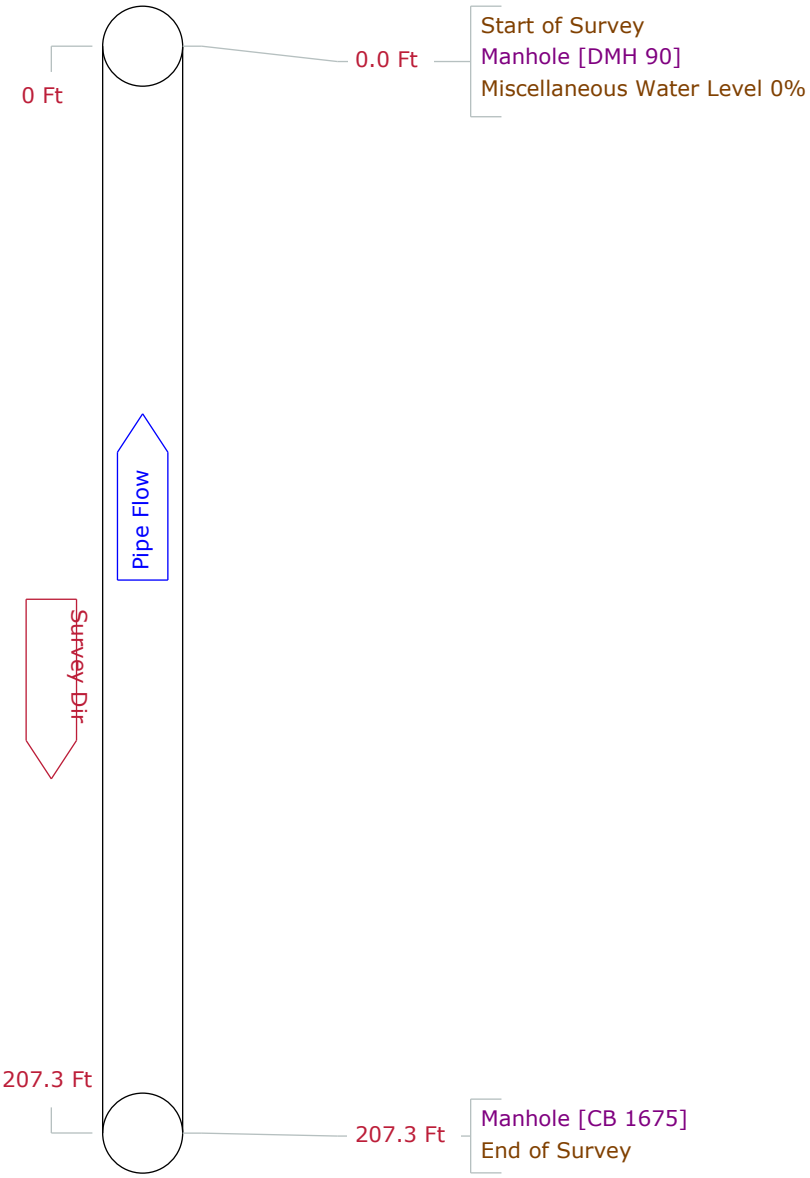
Pipe Graphic Report of PLR CB 1675 X for Woodard and Curran

Setup	87	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/20	**Time**	7:52	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	Brookline Ave	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	12
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	207.3 Ft
Length Surveyed	207.30 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	CB 1675	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 90	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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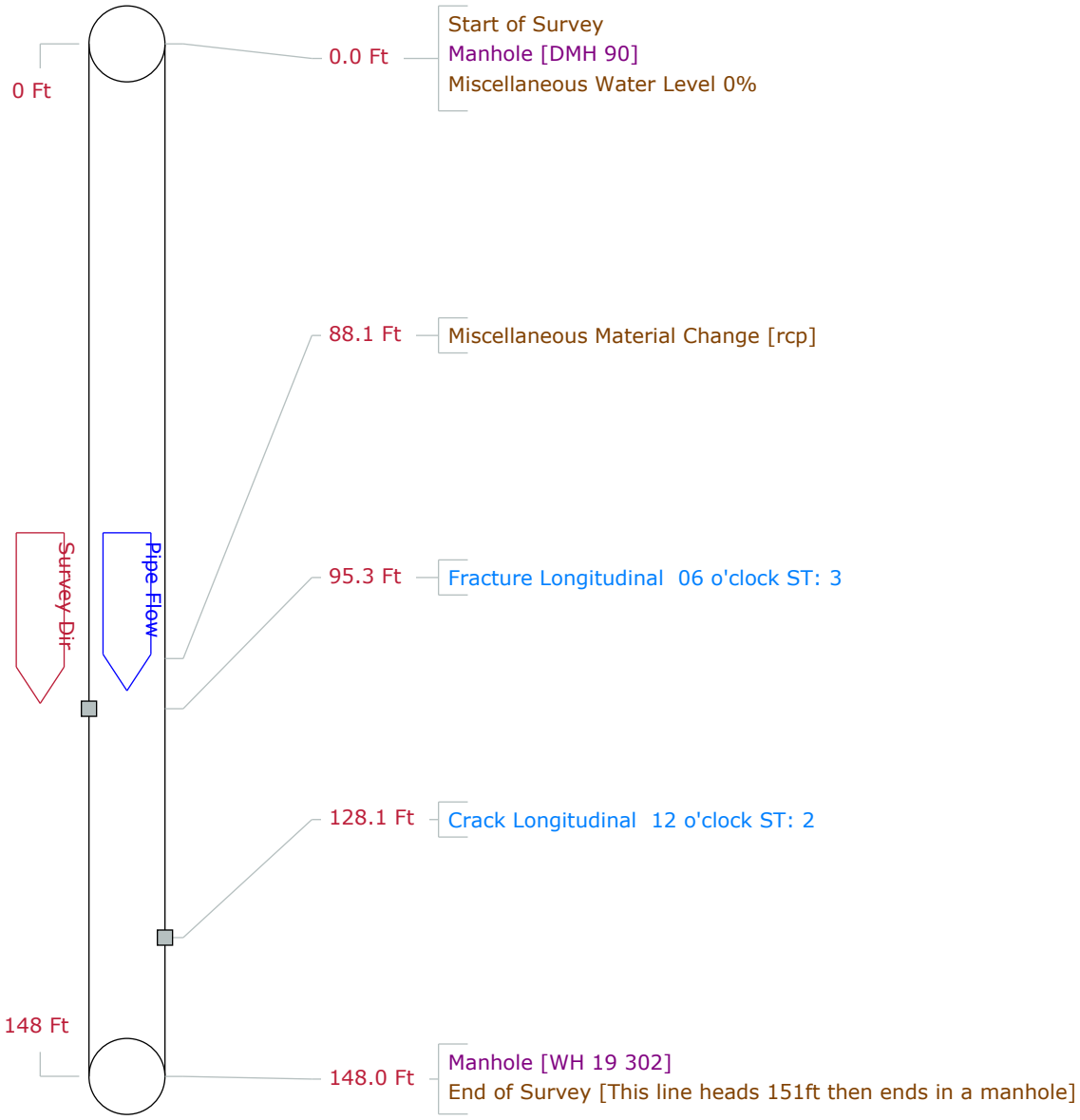
Pipe Graphic Report of PLR DMH 90 X for Woodard and Curran

Setup	86	**Surveyed By**	ZC	**Certificate #**	614-06021733	**Owner**	
Reviewed By		**Reviewer #**		**Work Order**			
Customer				**P/O #**			
Media Label		**Project**	Agawam Storm Drain CCTV Investigation				
Date	2021/01/19	**Time**	13:45	**Weather**		**Pre-Cleaning**	N
Date Cleaned							
Flow control		**Survey Purpose**				**Direction**	Downstream
Street	Brookline Ave			**City**	Agawam	**Drainage area**	
Location Code						**Pipe Use**	Stormwater Pipe
Location details						**Height**	12 **Width** ins
Shape	Circular	**Material**	Vitrified Clay Pipe			**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	148.0 Ft	Structural	O & M
Length Surveyed	148.00 Ft	**Year Constructed**		**Year Renewed**		Miscellaneous	Constructional

Up	DMH 90	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	WH 19 302	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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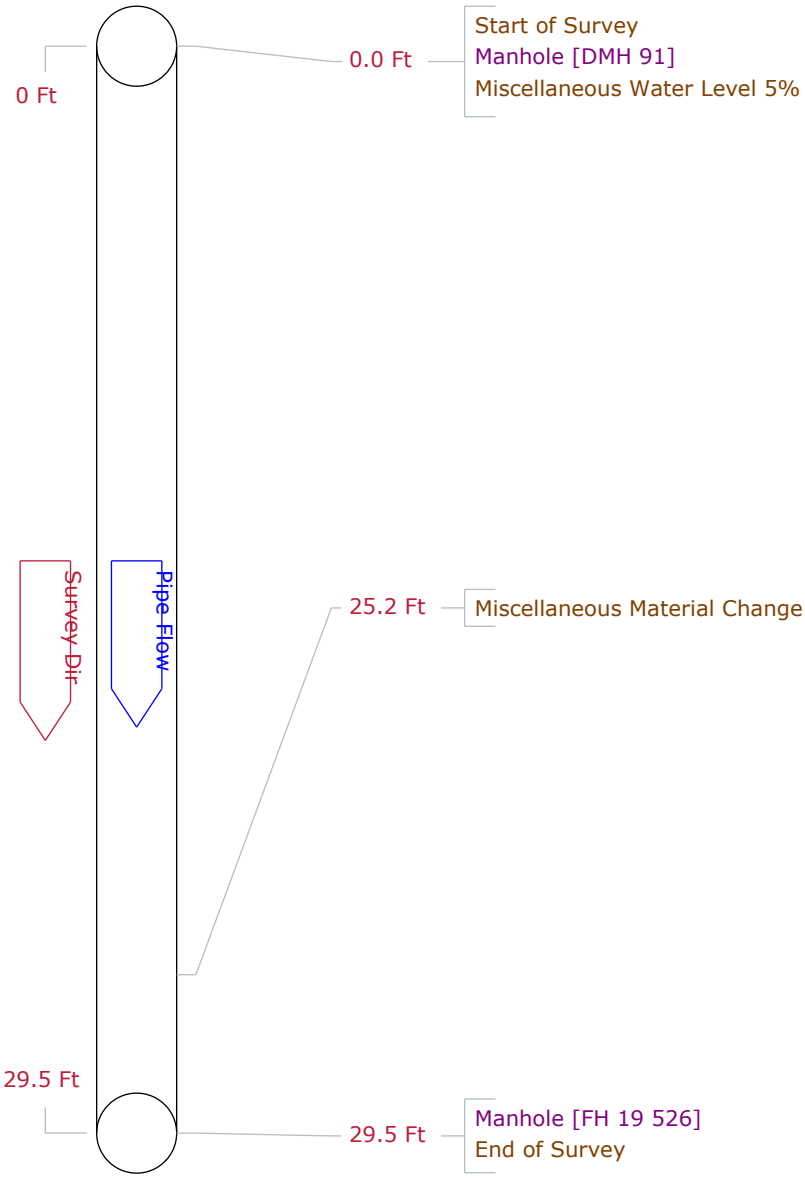
Pipe Graphic Report of PLR DMH 91 X for Woodard and Curran

Setup	52	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/13	**Time**	11:52	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Springfield St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	24
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	29.5 Ft
Length Surveyed	29.50 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 91	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	FH 19 526	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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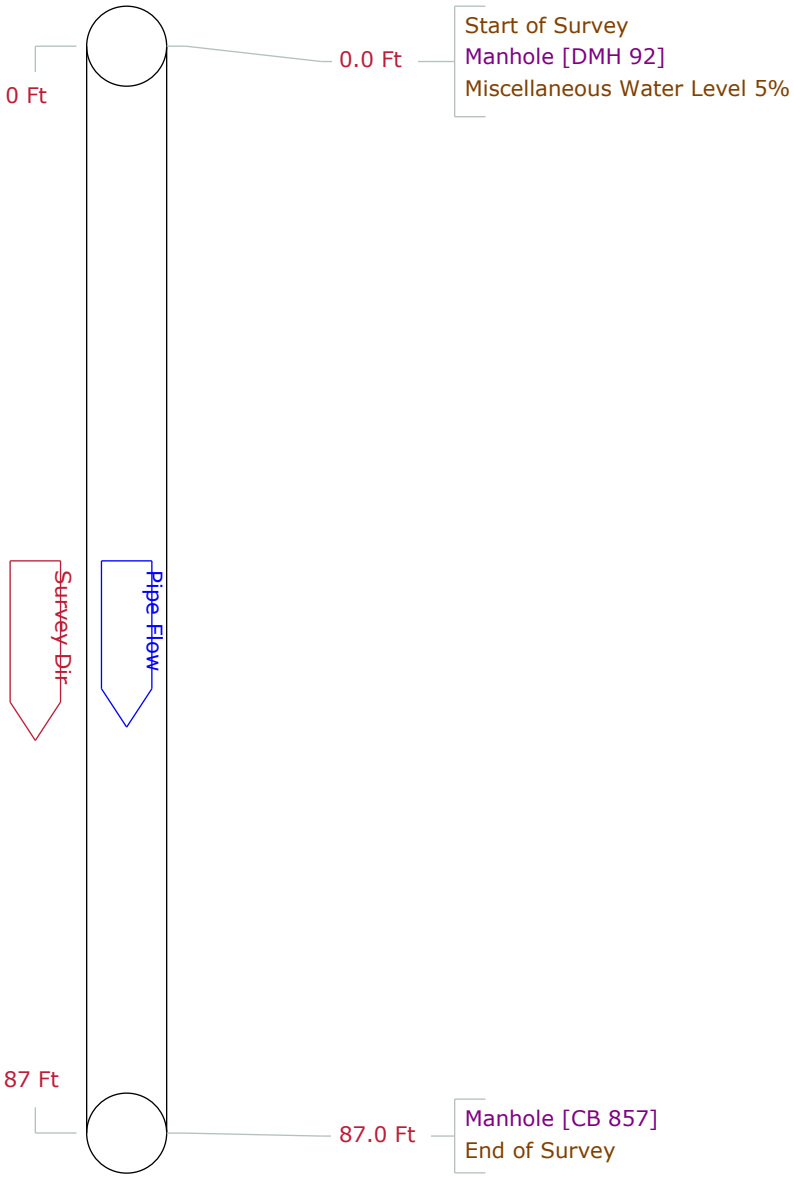
Pipe Graphic Report of PLR DMH 92 X for Woodard and Curran

Setup	46	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/12	**Time**	13:25	**Weather**	
Pre-Cleaning	N	**Date Cleaned**		**Flow control**	
Survey Purpose		**Direction**	Downstream		
Street	Springfield St.	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	18	**Width**	**ins**
Shape	Circular	**Material**	Corrugated Metal Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	87.0 **Ft**
Length Surveyed	87.00 **Ft**	**Year Constructed**		**Year Renewed**	

Structural O & M
Miscellaneous Constructional

Up	DMH 92	**Rim to invert**		**Grade to invert**	**Rim to grade**	**Ft**
Down	CB 857	**Rim to invert**		**Grade to invert**	**Rim to grade**	**Ft**



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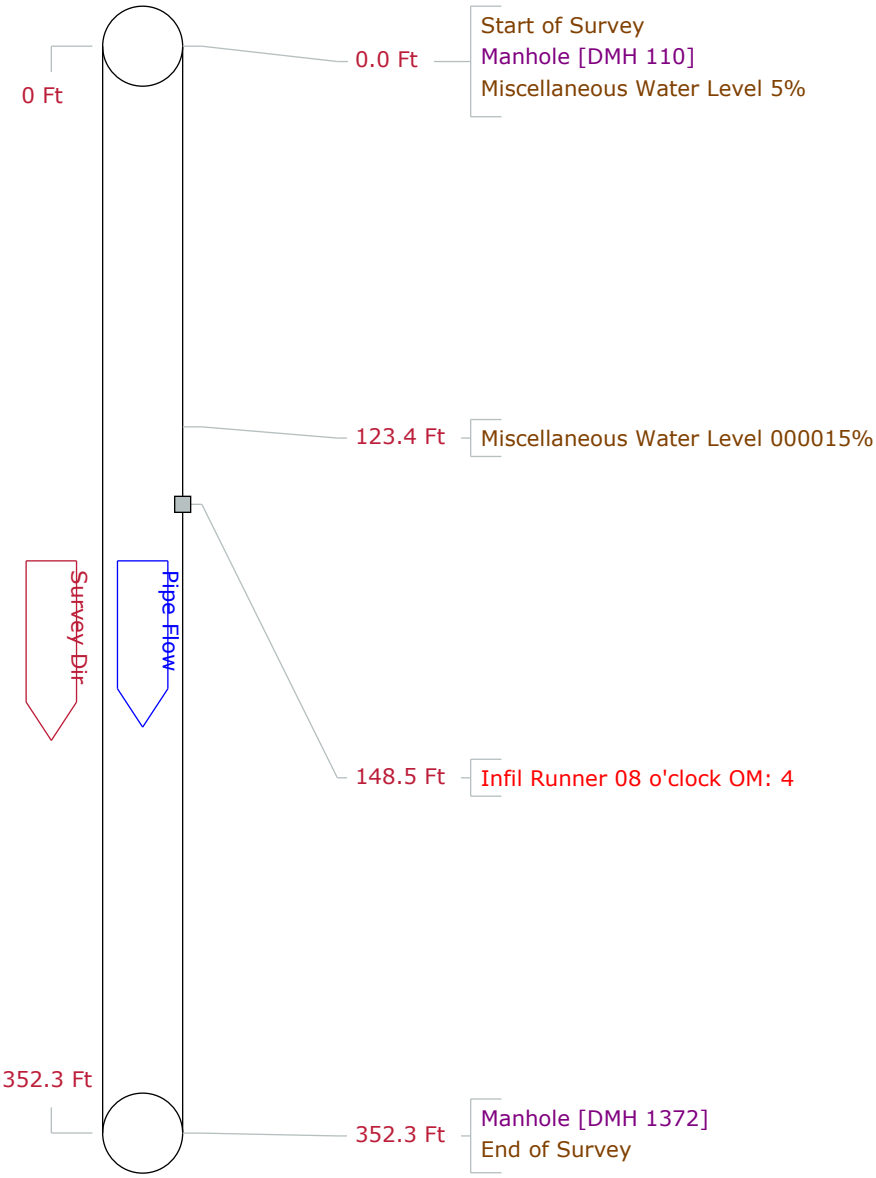
Pipe Graphic Report of PLR DMH 110 X for Woodard and Curran

Setup 23	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/07	**Time** 9:52	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Springfield St			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 48	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 352.3 Ft	Structural	O & M
Length Surveyed	352.30 Ft	**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up	DMH 110	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 1372	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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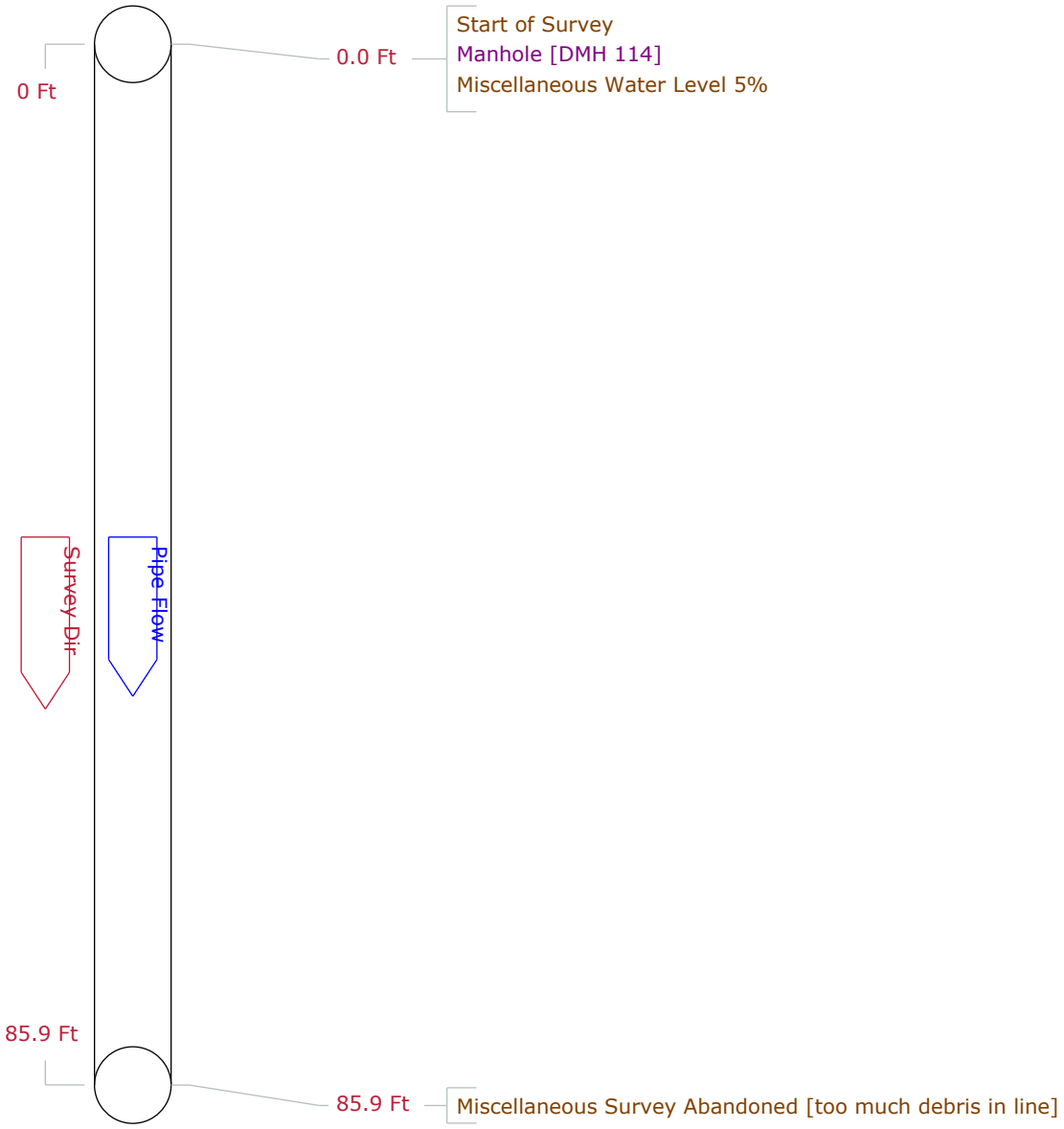
Pipe Graphic Report of PLR DMH 114 X for Woodard and Curran

Setup	75	**Surveyed By**	ZC	**Certificate #**	614-06021733	**Owner**	
Reviewed By		**Reviewer #**		**Work Order**			
Customer				**P/O #**			
Media Label		**Project**	Agawam Storm Drain CCTV Investigation				
Date	2021/01/15	**Time**	13:16	**Weather**		**Pre-Cleaning**	N
Date Cleaned							
Flow control		**Survey Purpose**				**Direction**	Downstream
Street	South West St.			**City**	Agawam	**Drainage area**	
Location Code						**Pipe Use**	Stormwater Pipe
Location details						**Height**	24
Width	ins						
Shape	Circular			**Material**	Reinforced Concrete Pipe	**Lining**	
Coating				**Pipe Joint length**	Ft	**Total length**	Ft
Length Surveyed	85.90 Ft	**Year Constructed**		**Year Renewed**			

Structural	O & M				
Miscellaneous	Constructional				

Up	DMH 114	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 121	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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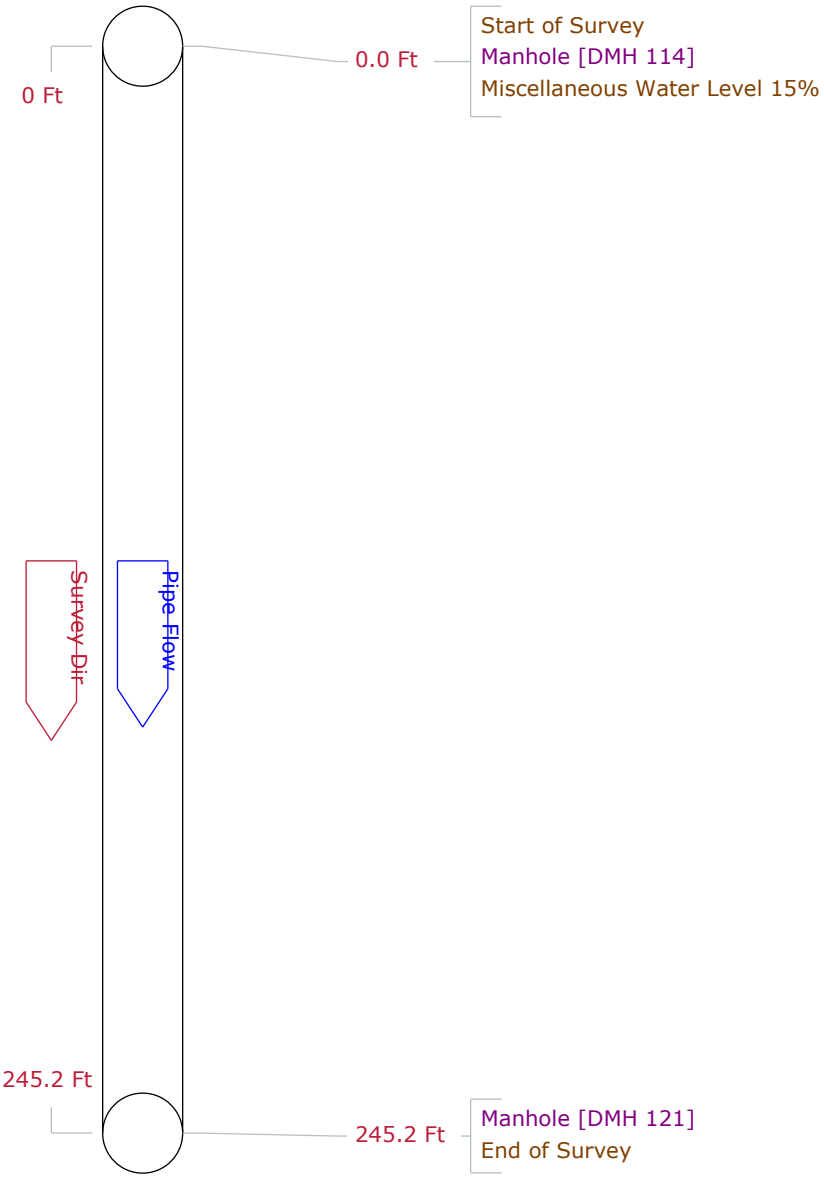
Pipe Graphic Report of PLR DMH 114 X for Woodard and Curran

Setup	80	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/19	**Time**	10:13	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Kathy Terrace	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	18
Width	**ins**				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	245.2 **Ft**
Length Surveyed	245.20 **Ft**	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 114	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 121	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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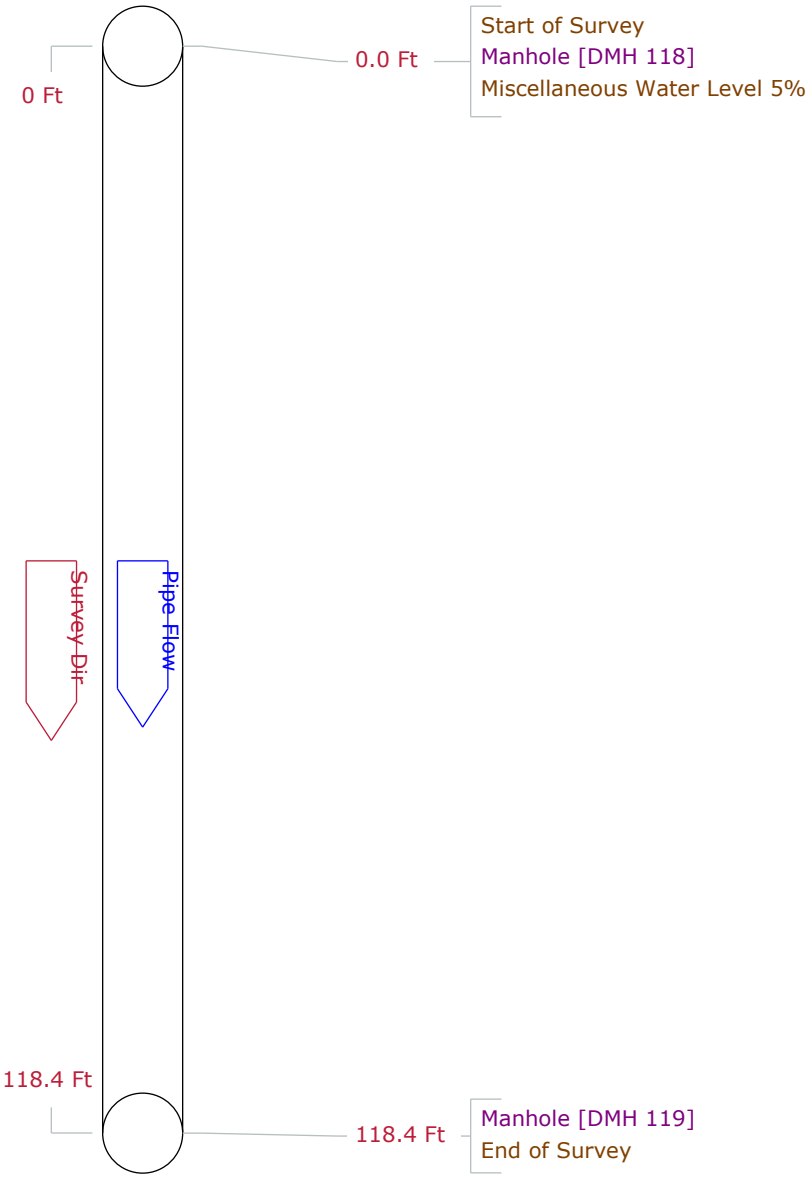
Pipe Graphic Report of PLR DMH 118 X for Woodard and Curran

Setup	63	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/14	**Time**	11:20	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Joanne Circle	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	28
Width		**ins**			
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	118.4 **Ft**
Length Surveyed	118.40 **Ft**	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 118	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 119	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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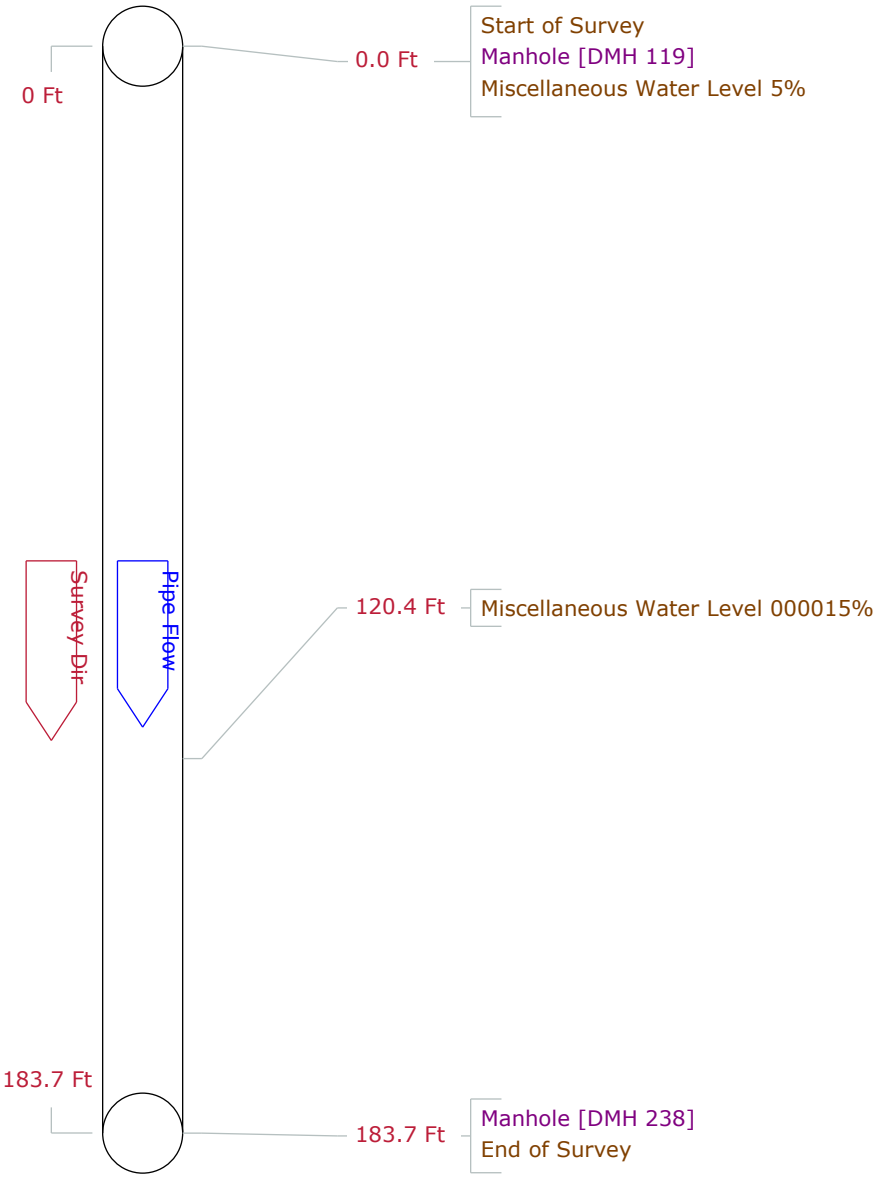
Pipe Graphic Report of PLR DMH 119 X for Woodard and Curran

Setup	64	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/14	**Time**	11:27	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Joanne Circle	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	28
Width	**ins**				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	183.7 **Ft**
Length Surveyed	183.70 **Ft**	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 119	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 238	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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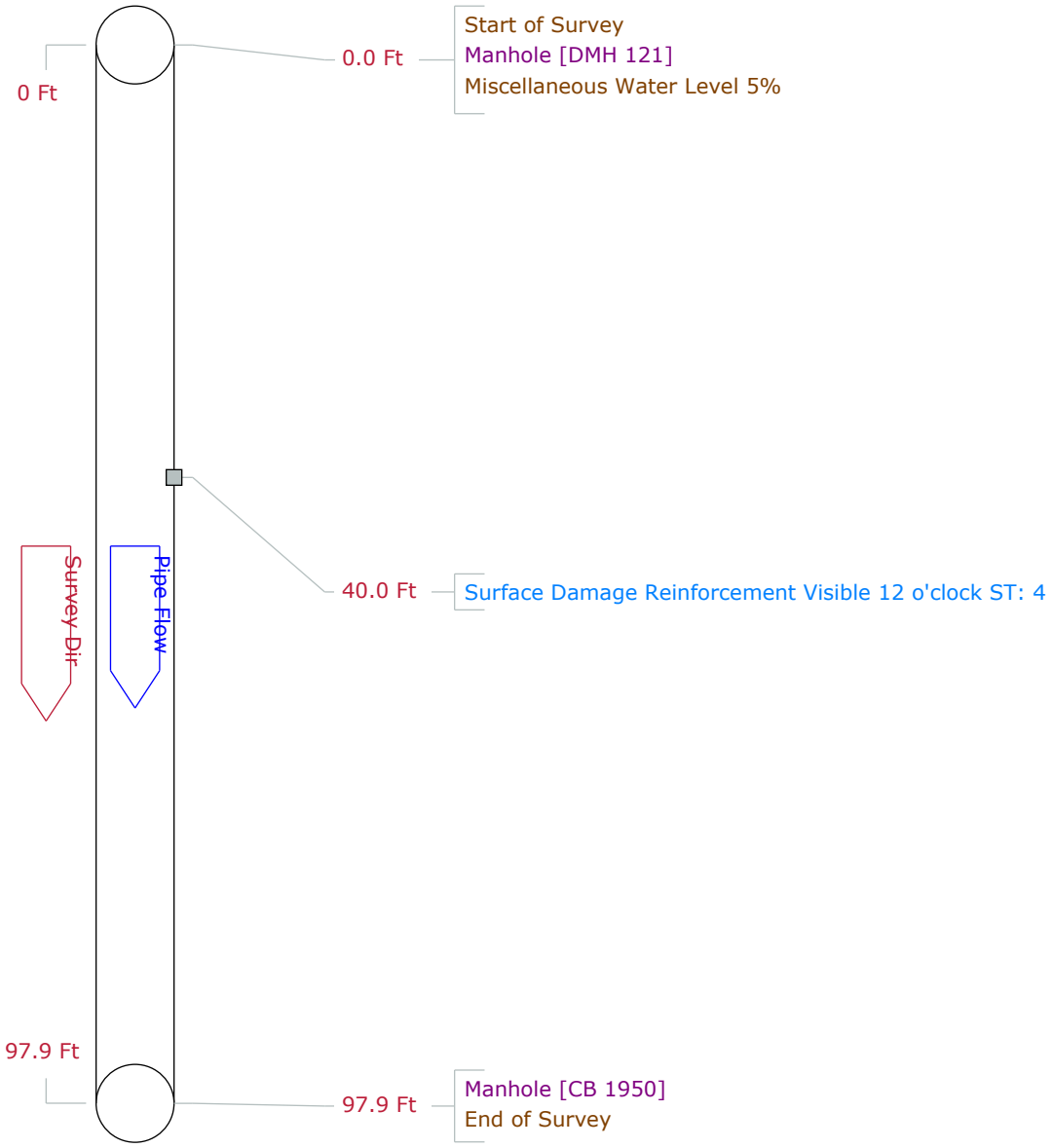
Pipe Graphic Report of PLR DMH 121 X for Woodard and Curran

Setup	81	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/19	**Time**	10:19	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Kathy Terrace	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	18
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	97.9 Ft
Length Surveyed	97.90 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 121	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	CB 1950	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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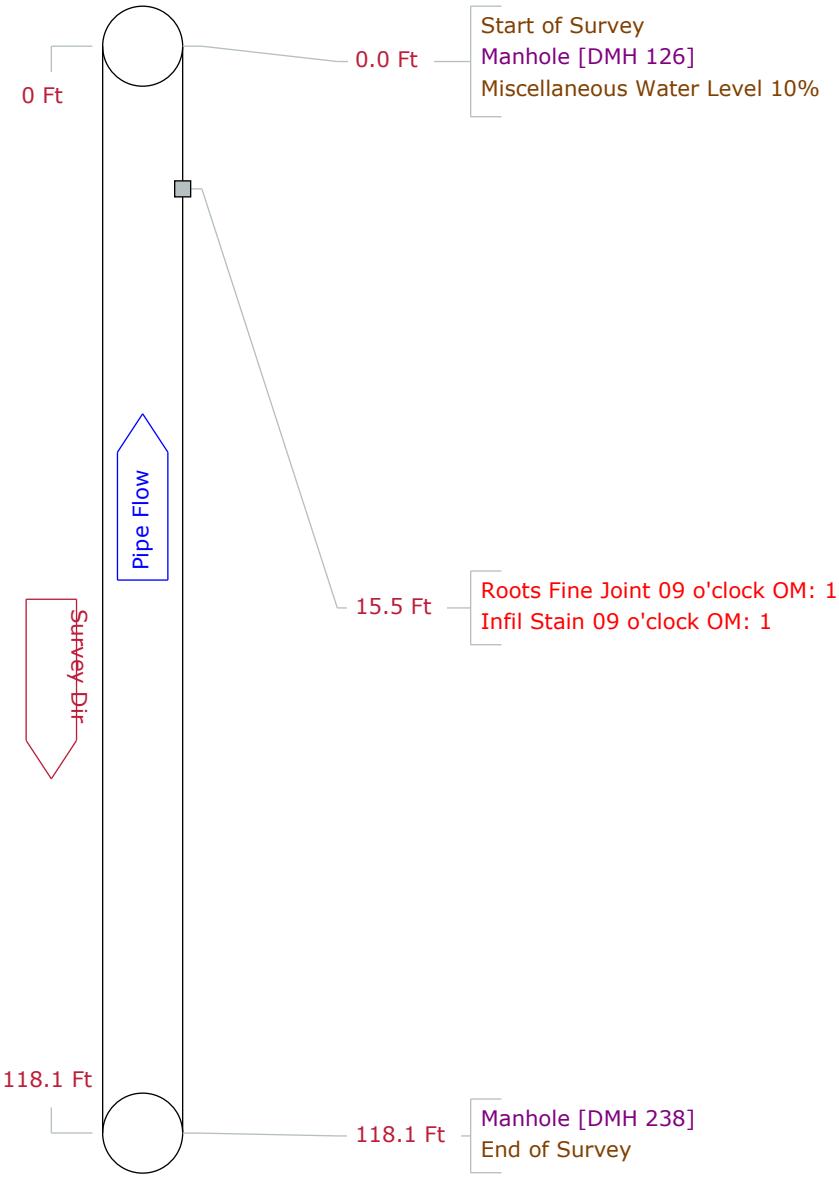
Pipe Graphic Report of PLR DMH 238 X for Woodard and Curran

Setup	73	**Surveyed By**	ZC	**Certificate #**	614-06021733	**Owner**	
Reviewed By		**Reviewer #**		**Work Order**			
Customer				**P/O #**			
Media Label		**Project**	Agawam Storm Drain CCTV Investigation				
Date	2021/01/15	**Time**	12:43	**Weather**		**Pre-Cleaning**	N
Date Cleaned							
Flow control		**Survey Purpose**				**Direction**	Upstream
Street	South West St.			**City**	Agawam	**Drainage area**	
Location Code						**Pipe Use**	Stormwater Pipe
Location details						**Height**	42
Width	ins						
Shape	Circular			**Material**	Reinforced Concrete Pipe	**Lining**	
Coating				**Pipe Joint length**	Ft	**Total length**	118.1 Ft
Length Surveyed	118.10 Ft	**Year Constructed**		**Year Renewed**			

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 238	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 126	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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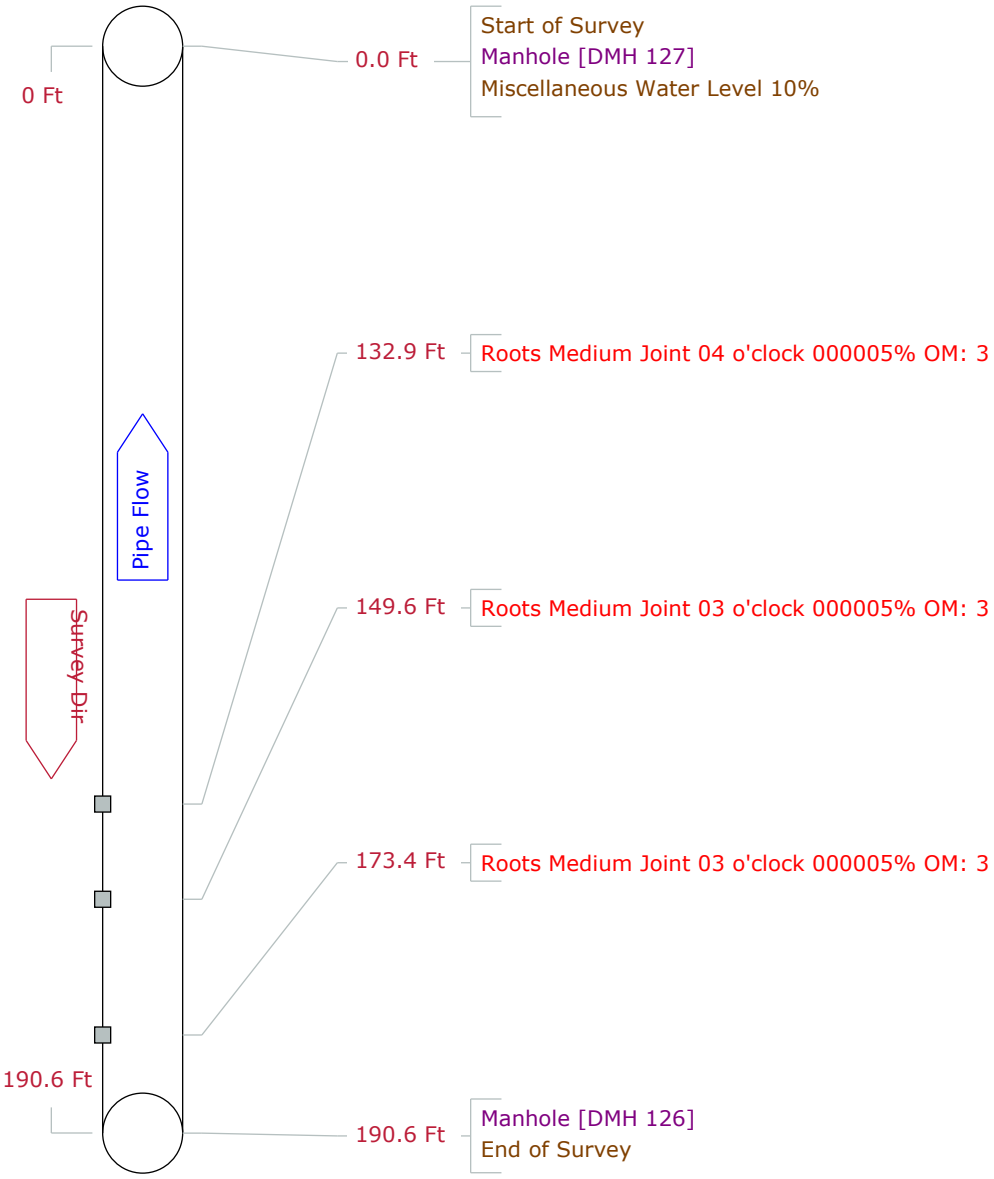
Pipe Graphic Report of PLR DMH 126 X for Woodard and Curran

Setup	72	**Surveyed By**	ZC	**Certificate #**	614-06021733	**Owner**	
Reviewed By		**Reviewer #**		**Work Order**			
Customer				**P/O #**			
Media Label		**Project**	Agawam Storm Drain CCTV Investigation				
Date	2021/01/15	**Time**	12:36	**Weather**		**Pre-Cleaning**	N
Date Cleaned		**Flow control**		**Survey Purpose**		**Direction**	Upstream
Street	South West St.	**City**	Agawam	**Drainage area**			
Location Code		**Pipe Use**	Stormwater Pipe				
Location details		**Height**	42	**Width**	ins		
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**			
Coating		**Pipe Joint length**	Ft	**Total length**	190.6 Ft	Structural	O & M
Length Surveyed	190.60 Ft	**Year Constructed**		**Year Renewed**		Miscellaneous	Constructional

Up	DMH 126	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 127	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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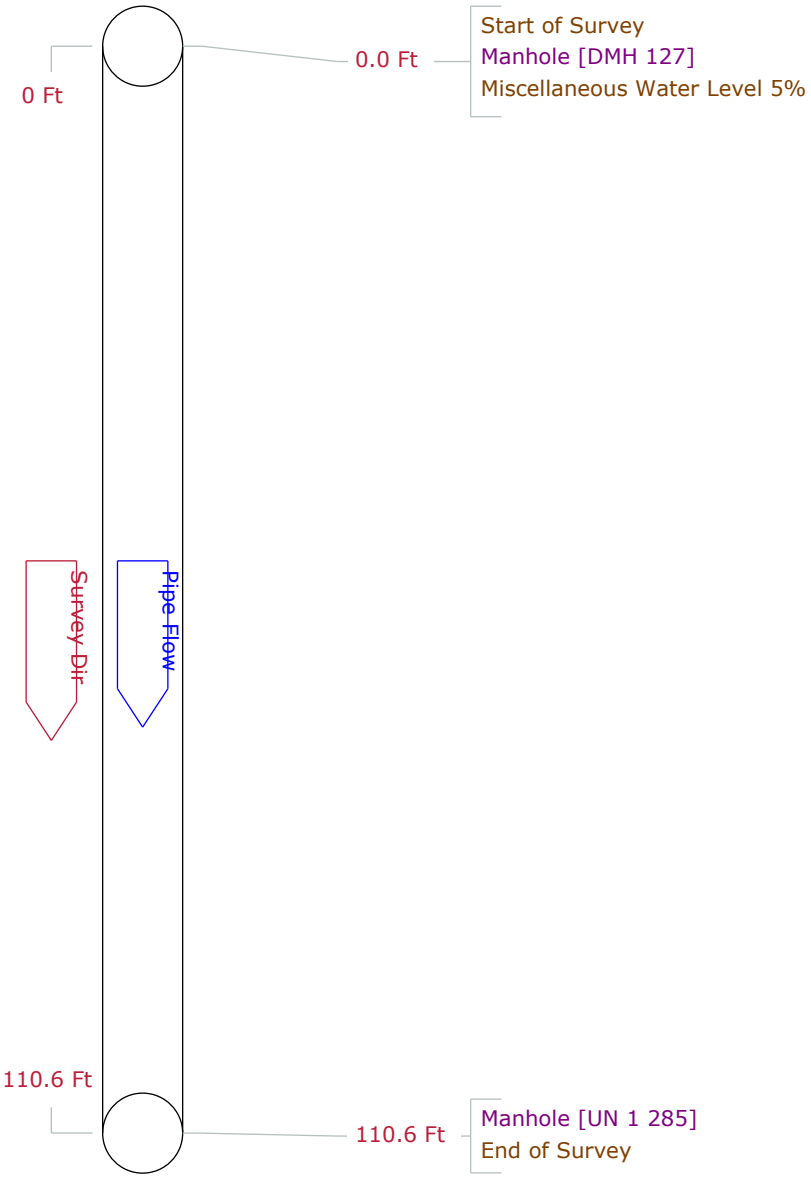
Pipe Graphic Report of PLR DMH 127 X for Woodard and Curran

Setup	74	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/15	**Time**	12:55	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	South West St.	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	42	**Width**	ins
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	110.6 Ft
Length Surveyed	110.60 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 127	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	UN 1 285	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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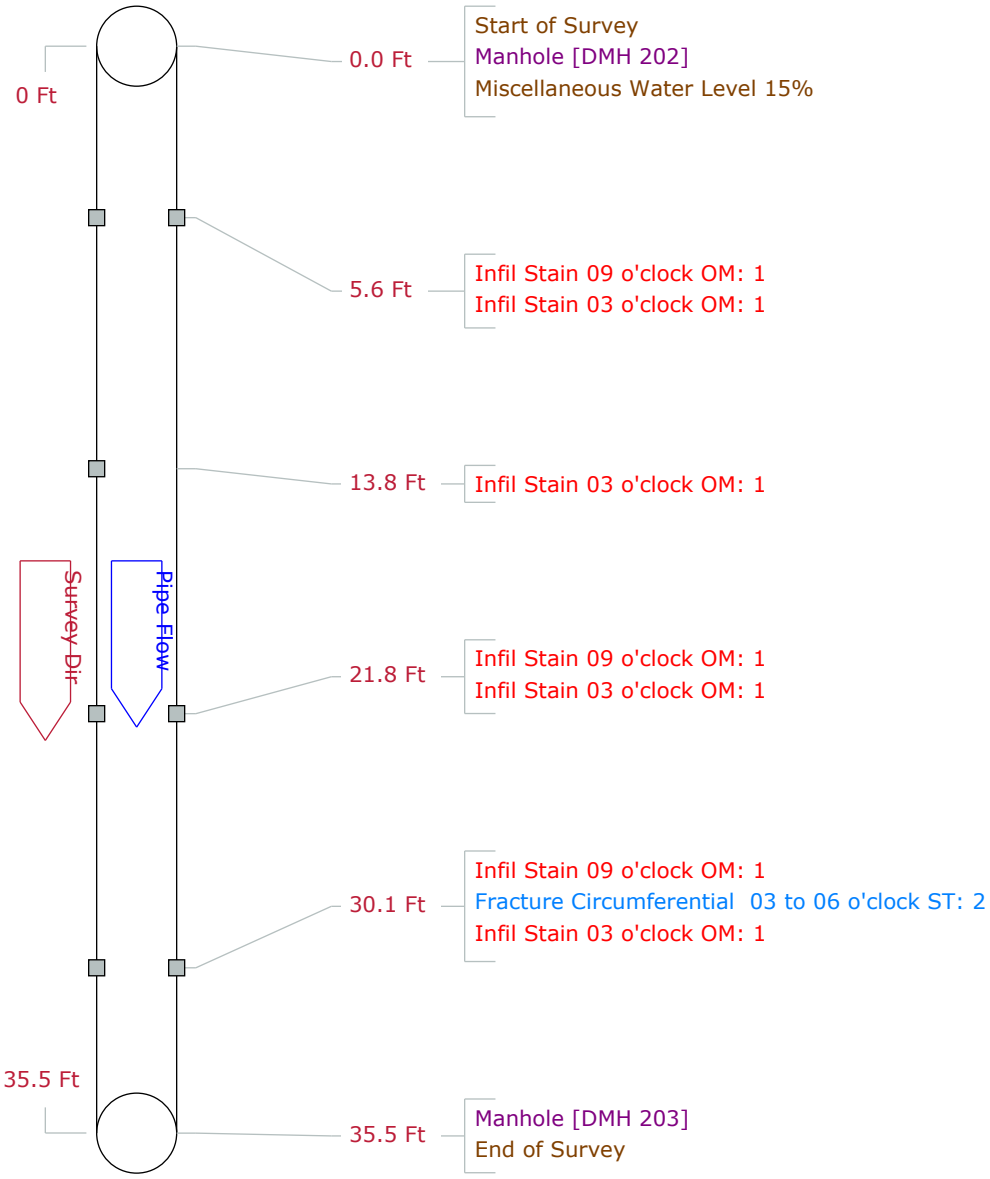
Pipe Graphic Report of PLR DMH 202 X for Woodard and Curran

Setup	78	**Surveyed By**	ZC	**Certificate #**	614-06021733	**Owner**	
Reviewed By		**Reviewer #**		**Work Order**			
Customer				**P/O #**			
Media Label		**Project**	Agawam Storm Drain CCTV Investigation				
Date	2021/01/19	**Time**	8:54	**Weather**		**Pre-Cleaning**	N
Date Cleaned							
Flow control		**Survey Purpose**				**Direction**	Downstream
Street	Independence Rd.			**City**	Agawam	**Drainage area**	
Location Code						**Pipe Use**	Stormwater Pipe
Location details						**Height**	20
Width	ins						
Shape	Circular			**Material**	Reinforced Concrete Pipe	**Lining**	
Coating				**Pipe Joint length**	Ft	**Total length**	35.5 Ft
Length Surveyed	35.50 Ft	**Year Constructed**		**Year Renewed**			

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 202	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 203	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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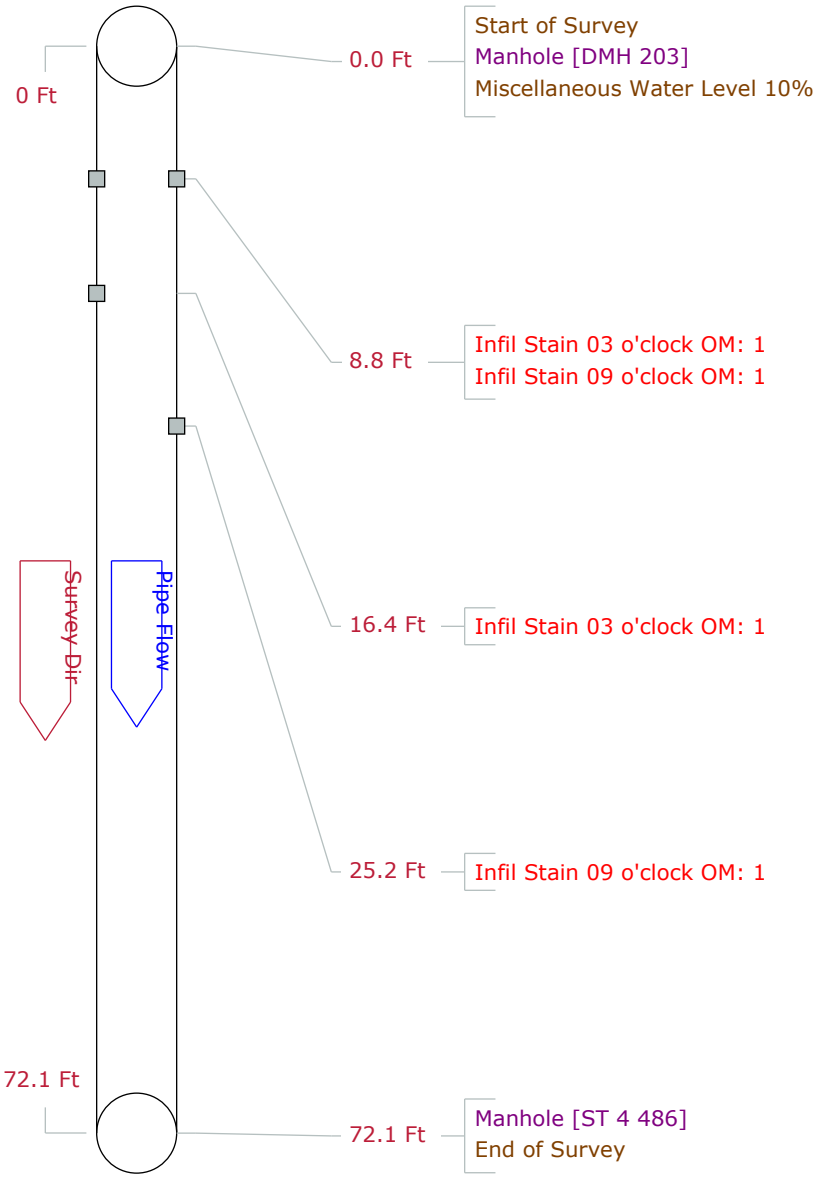
Pipe Graphic Report of PLR DMH 203 X for Woodard and Curran

Setup	79	**Surveyed By**	ZC	**Certificate #**	614-06021733	**Owner**	
Reviewed By		**Reviewer #**		**Work Order**			
Customer				**P/O #**			
Media Label		**Project**	Agawam Storm Drain CCTV Investigation				
Date	2021/01/19	**Time**	9:02	**Weather**		**Pre-Cleaning**	N
Date Cleaned							
Flow control		**Survey Purpose**				**Direction**	Downstream
Street	Independence Rd.			**City**	Agawam	**Drainage area**	
Location Code						**Pipe Use**	Stormwater Pipe
Location details						**Height**	30
Width	ins						
Shape	Circular			**Material**	Reinforced Concrete Pipe	**Lining**	
Coating				**Pipe Joint length**	Ft	**Total length**	72.1 Ft
Length Surveyed	72.10 Ft	**Year Constructed**		**Year Renewed**			

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 203	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	ST 4 486	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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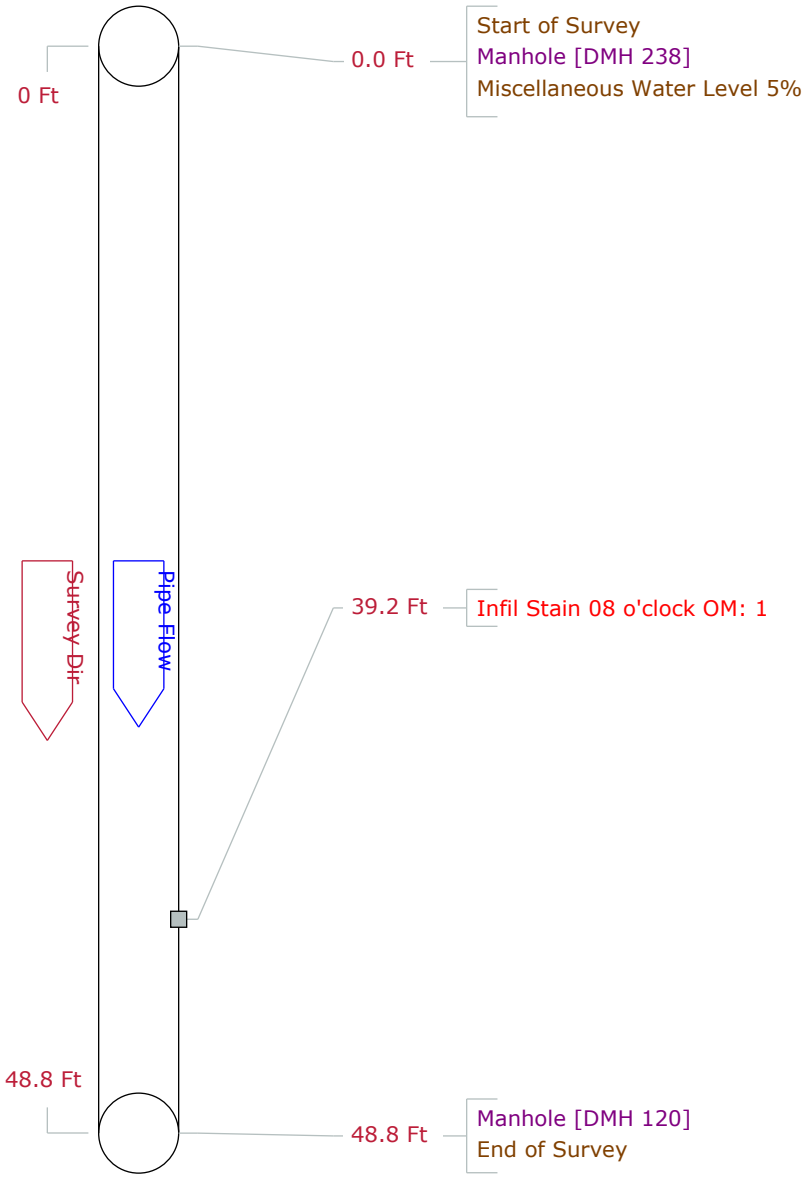
Pipe Graphic Report of PLR DMH 238 X for Woodard and Curran

Setup	65	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/14	**Time**	11:33	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Joanne Circle	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	28
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	48.8 Ft
Length Surveyed	48.80 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 238	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 120	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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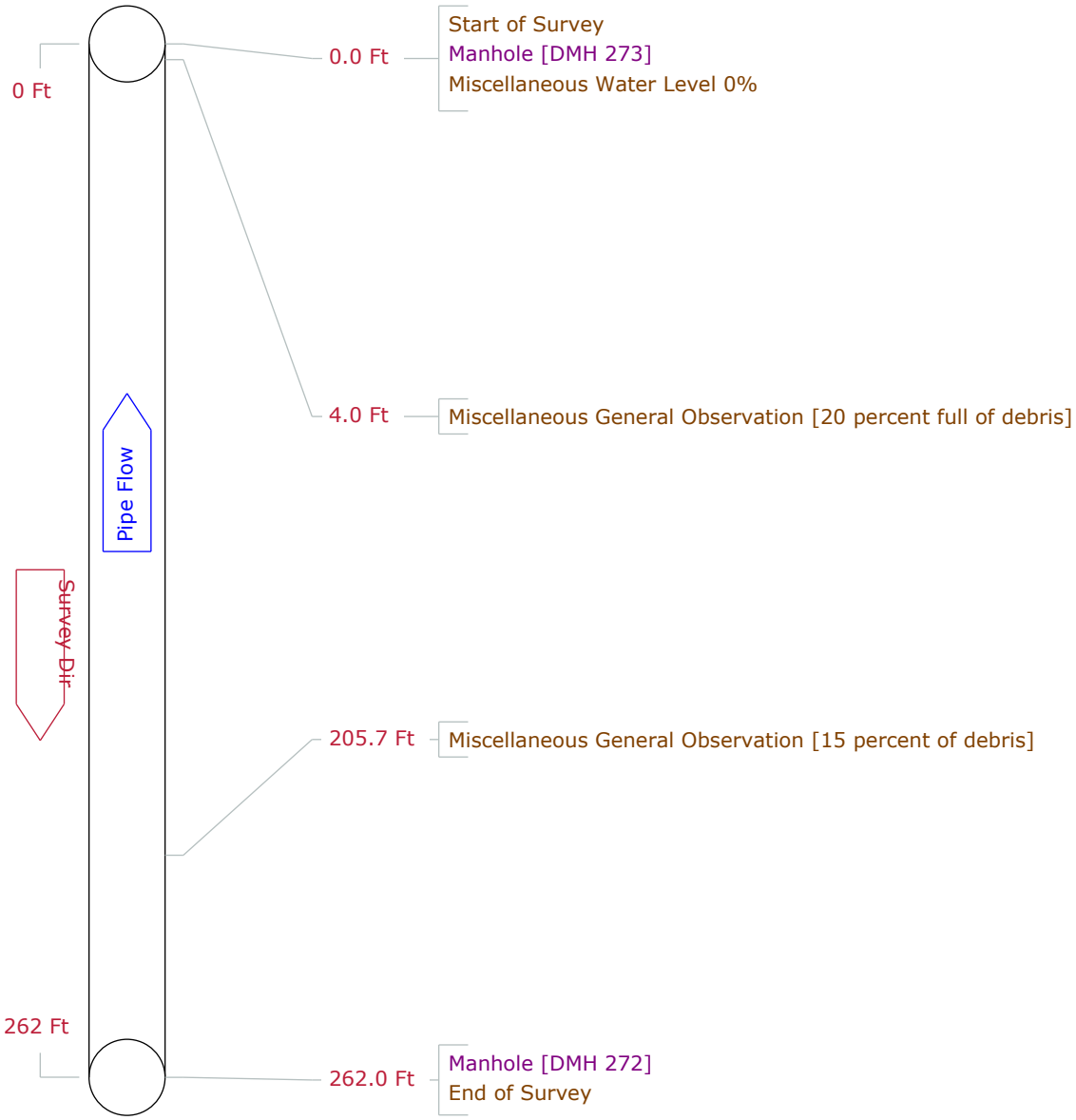
Pipe Graphic Report of PLR DMH 272 X for Woodard and Curran

Setup	100	**Surveyed By**	ZC	**Certificate #**	614-06021733	**Owner**	
Reviewed By		**Reviewer #**		**Work Order**			
Customer				**P/O #**			
Media Label		**Project**	Agawam Storm Drain CCTV Investigation				
Date	2021/01/21	**Time**	11:52	**Weather**		**Pre-Cleaning**	N
Date Cleaned							
Flow control		**Survey Purpose**				**Direction**	Upstream
Street	Carmel Lane			**City**	Agawam	**Drainage area**	
Location Code						**Pipe Use**	Stormwater Pipe
Location details						**Height**	12
Width	ins						
Shape	Circular			**Material**	Reinforced Concrete Pipe	**Lining**	
Coating				**Pipe Joint length**	Ft	**Total length**	262.0 Ft
Length Surveyed	262.00 Ft	**Year Constructed**		**Year Renewed**			

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 272	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 273	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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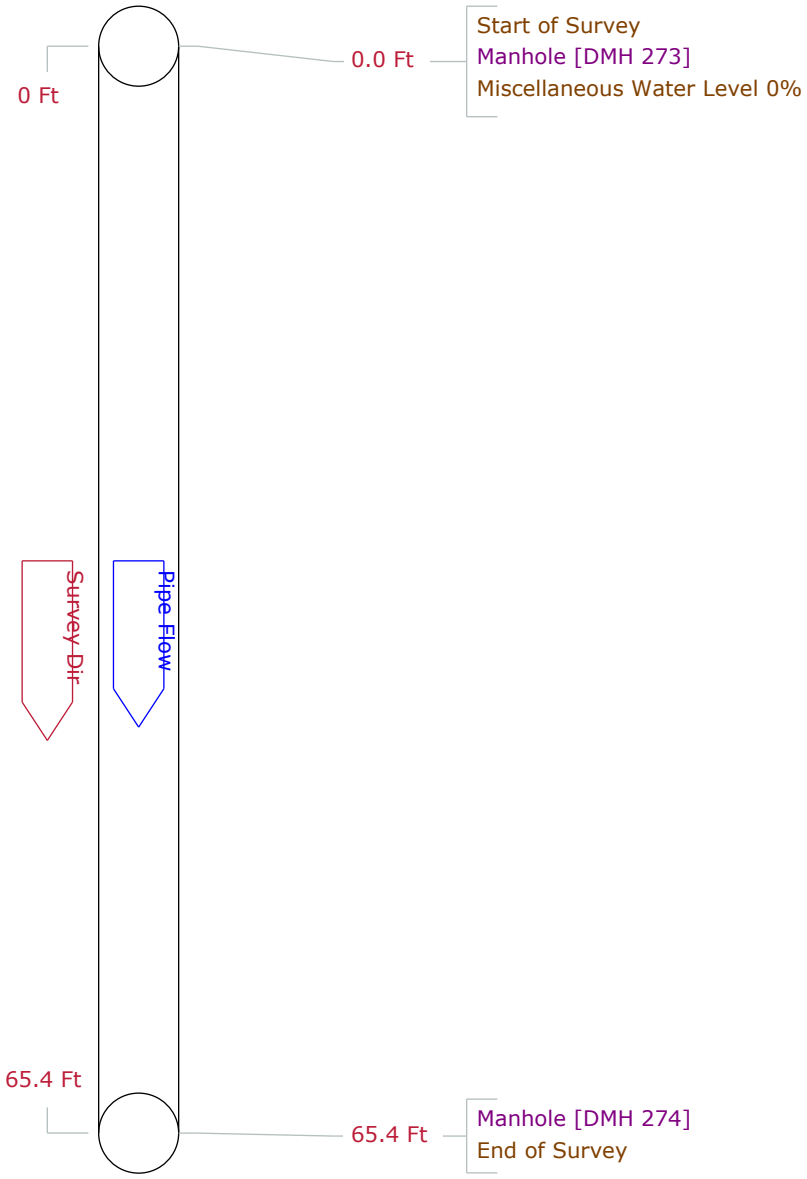
Pipe Graphic Report of PLR DMH 273 X for Woodard and Curran

Setup	101	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/21	**Time**	12:28	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Carmel Lane	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	12	**Width**	ins
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	65.4 Ft
Length Surveyed	65.40 Ft	**Year Constructed**		**Year Renewed**	

Structural O & M
Miscellaneous Constructional

Up	DMH 273	**Rim to invert**		**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 274	**Rim to invert**		**Grade to invert**	**Rim to grade**	**Ft**



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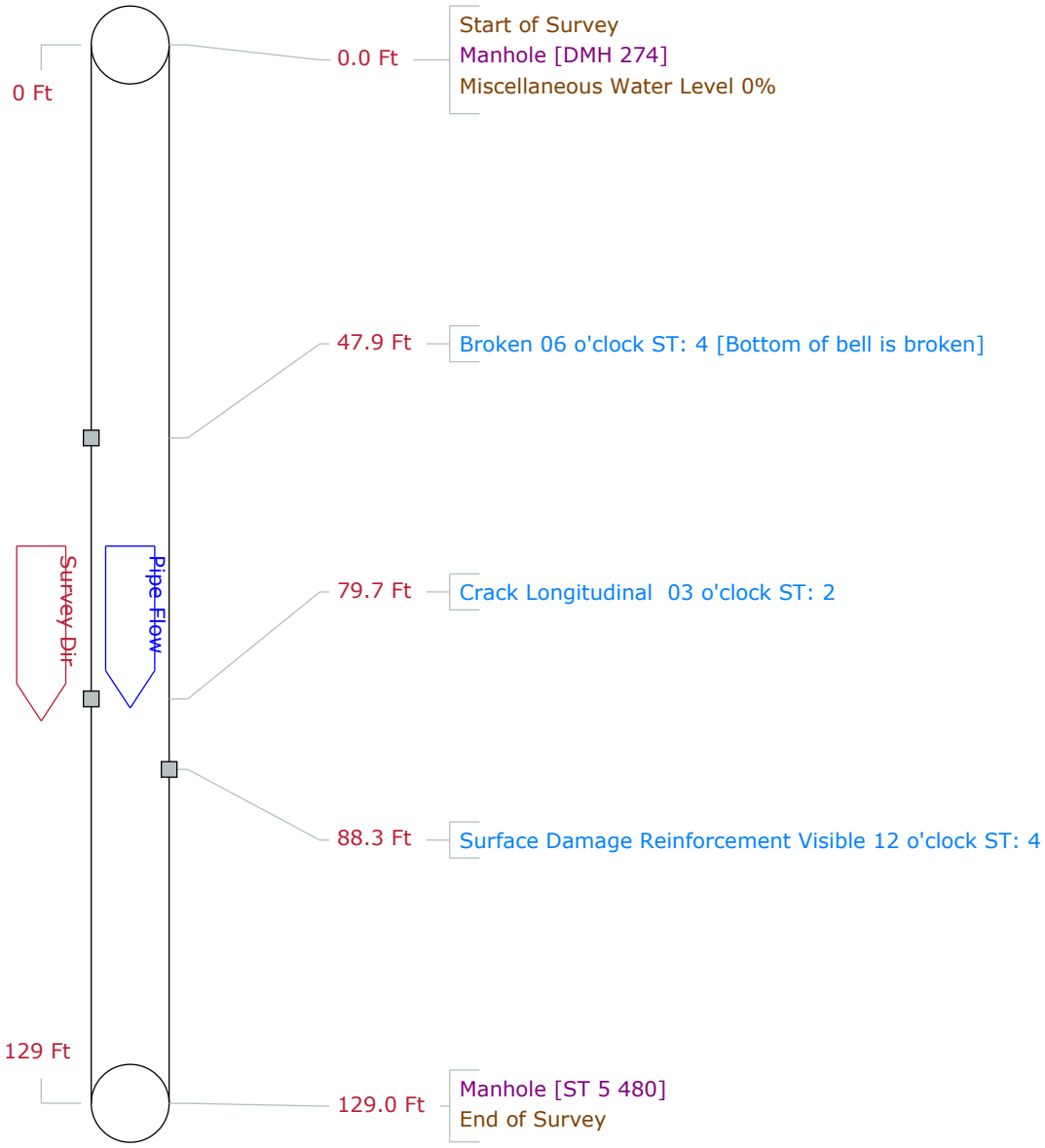
Pipe Graphic Report of PLR DMH 274 X for Woodard and Curran

Setup	102	**Surveyed By**	ZC	**Certificate #**	614-06021733	**Owner**	
Reviewed By		**Reviewer #**		**Work Order**			
Customer				**P/O #**			
Media Label		**Project**	Agawam Storm Drain CCTV Investigation				
Date	2021/01/21	**Time**	12:53	**Weather**		**Pre-Cleaning**	N
Date Cleaned							
Flow control		**Survey Purpose**				**Direction**	Downstream
Street	Carmel Lane			**City**	Agawam	**Drainage area**	
Location Code						**Pipe Use**	Stormwater Pipe
Location details						**Height**	12
Width	ins						
Shape	Circular			**Material**	Reinforced Concrete Pipe	**Lining**	
Coating				**Pipe Joint length**	Ft	**Total length**	129.0 Ft
Length Surveyed	129.00 Ft	**Year Constructed**		**Year Renewed**			

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 274	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	ST 5 480	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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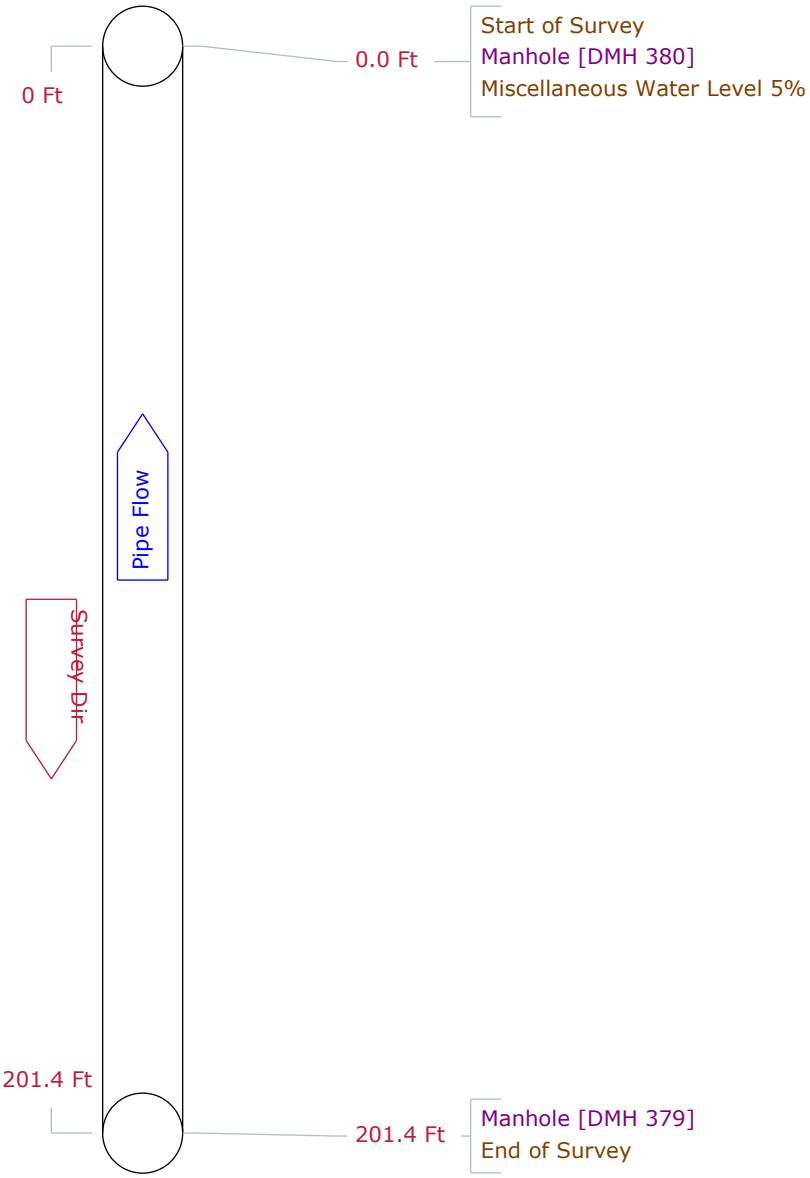
Pipe Graphic Report of PLR DMH 379 X **for** **Woodard and Curran**

Setup	15	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/05	**Time**	13:38	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	Thalia Dr.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	24
Width	**ins**				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	201.4 **Ft**
Length Surveyed	201.40 **Ft**	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 379	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 380	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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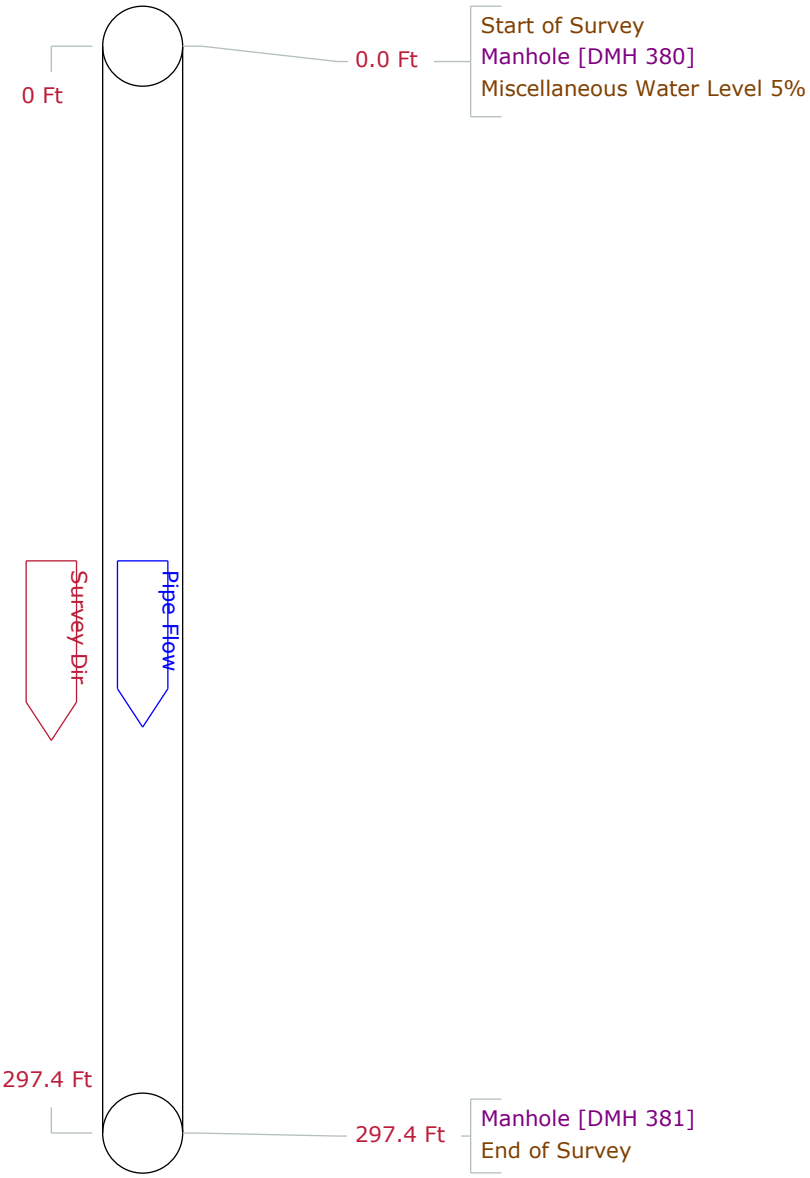
Pipe Graphic Report of PLR DMH 380 X for Woodard and Curran

Setup 12	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/05	**Time** 11:56	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Thalia Dr.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height** 24	**Width** ins
Shape Circular		**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft** **Total length** 297.4	**Ft**	Structural / O & M
Length Surveyed	297.40 **Ft**	**Year Constructed**	**Year Renewed**		Miscellaneous / Constructional

Up	DMH 380	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 381	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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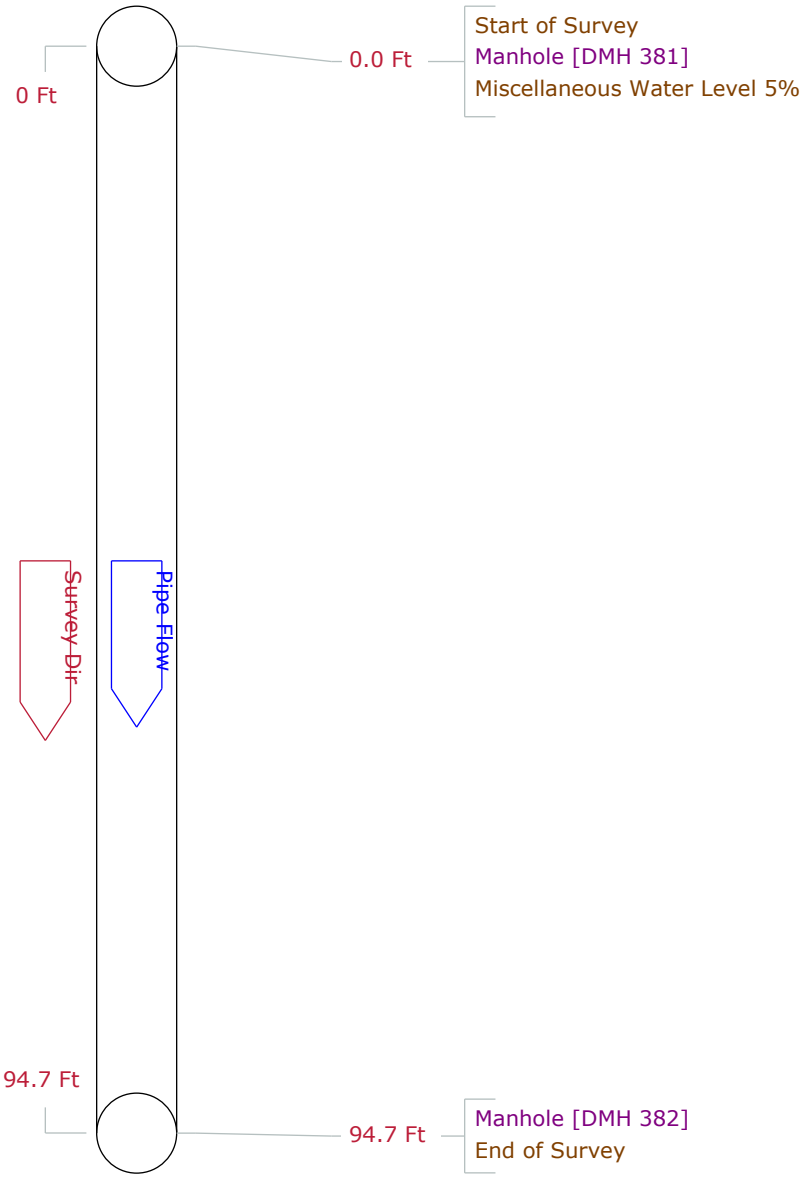
Pipe Graphic Report of PLR DMH 381 X for Woodard and Curran

Setup 13	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/05	**Time** 12:08	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Thalia Dr.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 24	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 94.7 Ft	Structural	O & M
Length Surveyed 94.70 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 381	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 382	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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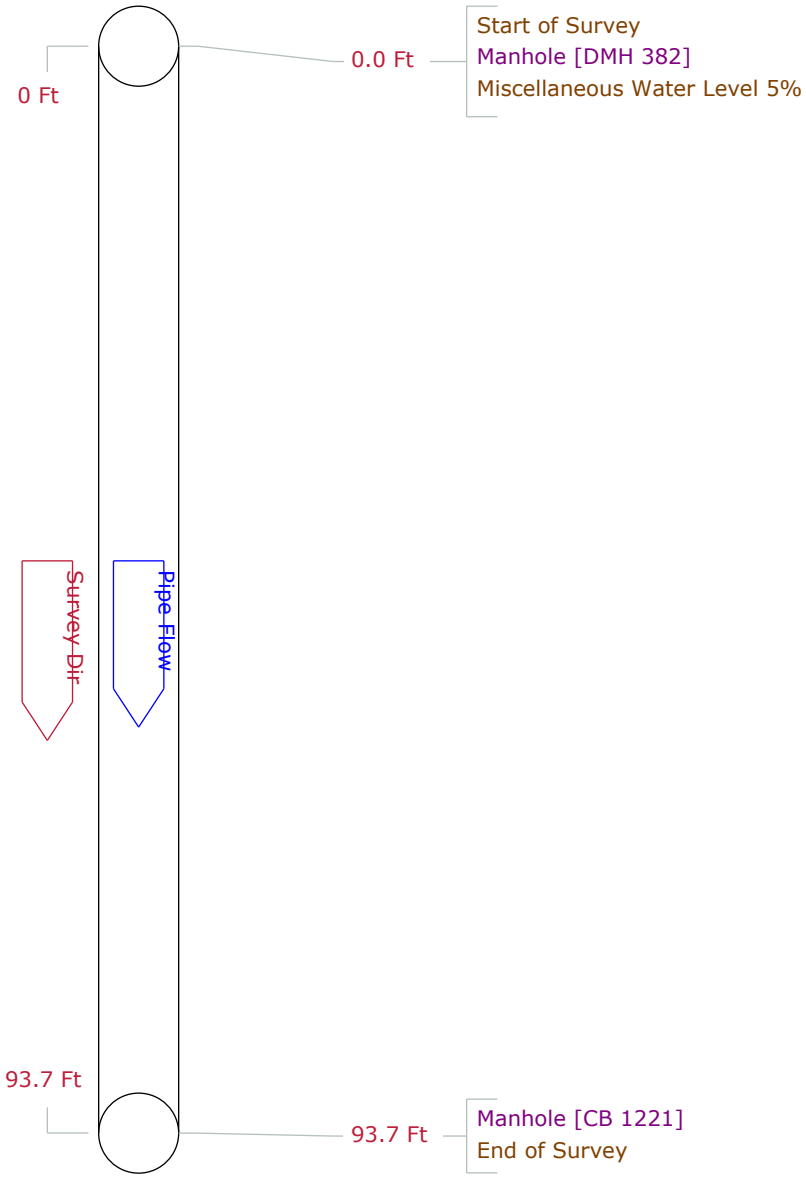
Pipe Graphic Report of PLR DMH 382 X **for** **Woodard and Curran**

Setup	14	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/05	**Time**	12:20	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Thalia Dr.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	24
Width	**ins**				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	93.7 **Ft**
Length Surveyed	93.70 **Ft**	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 382	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	CB 1221	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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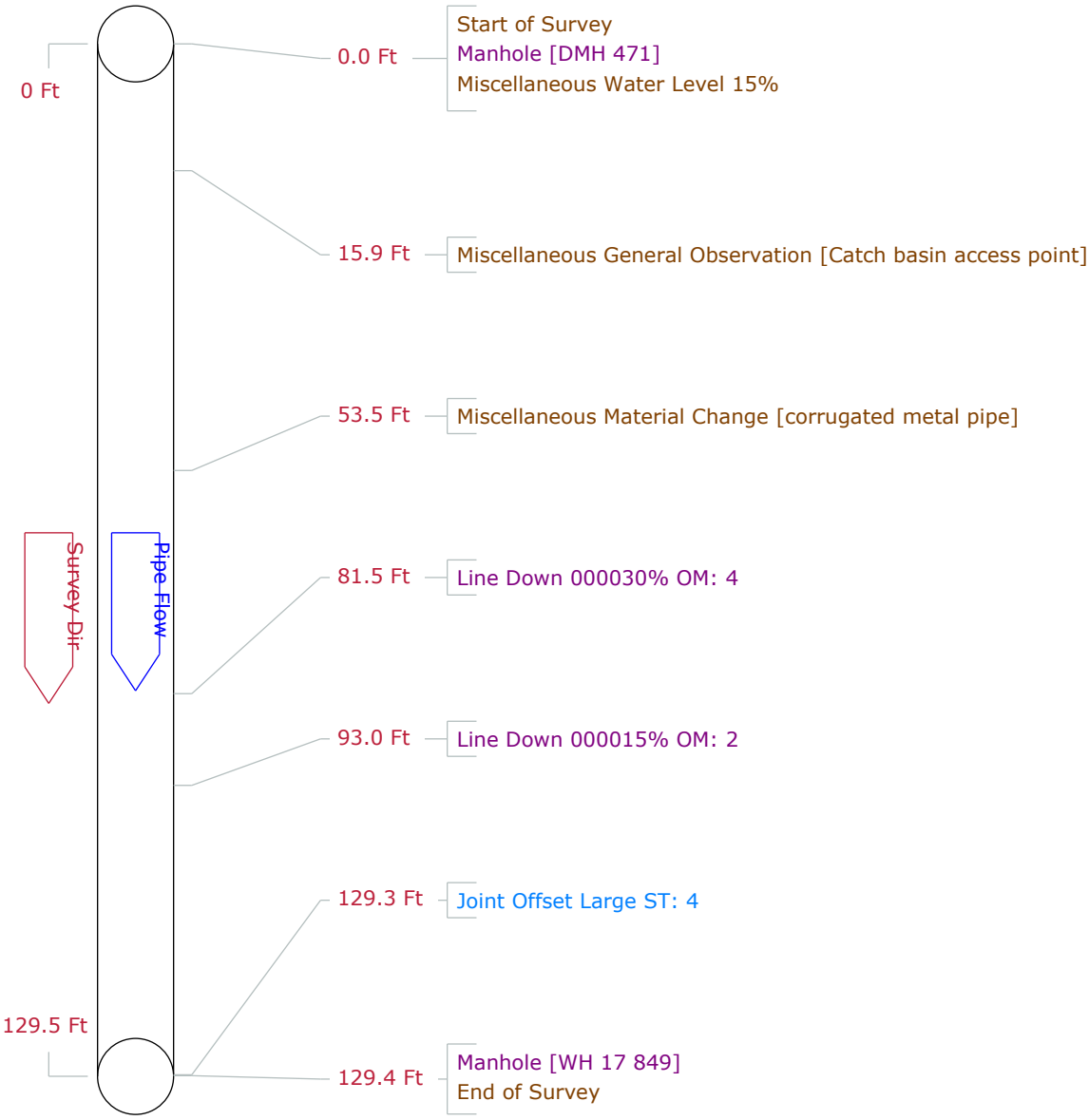
Pipe Graphic Report of PLR DMH 471 X for Woodard and Curran

Setup 11	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/05	**Time** 8:58	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Princeton Ave.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 36	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 129.5 Ft	Structural	O & M
Length Surveyed 129.40 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 471	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down WH 17 849	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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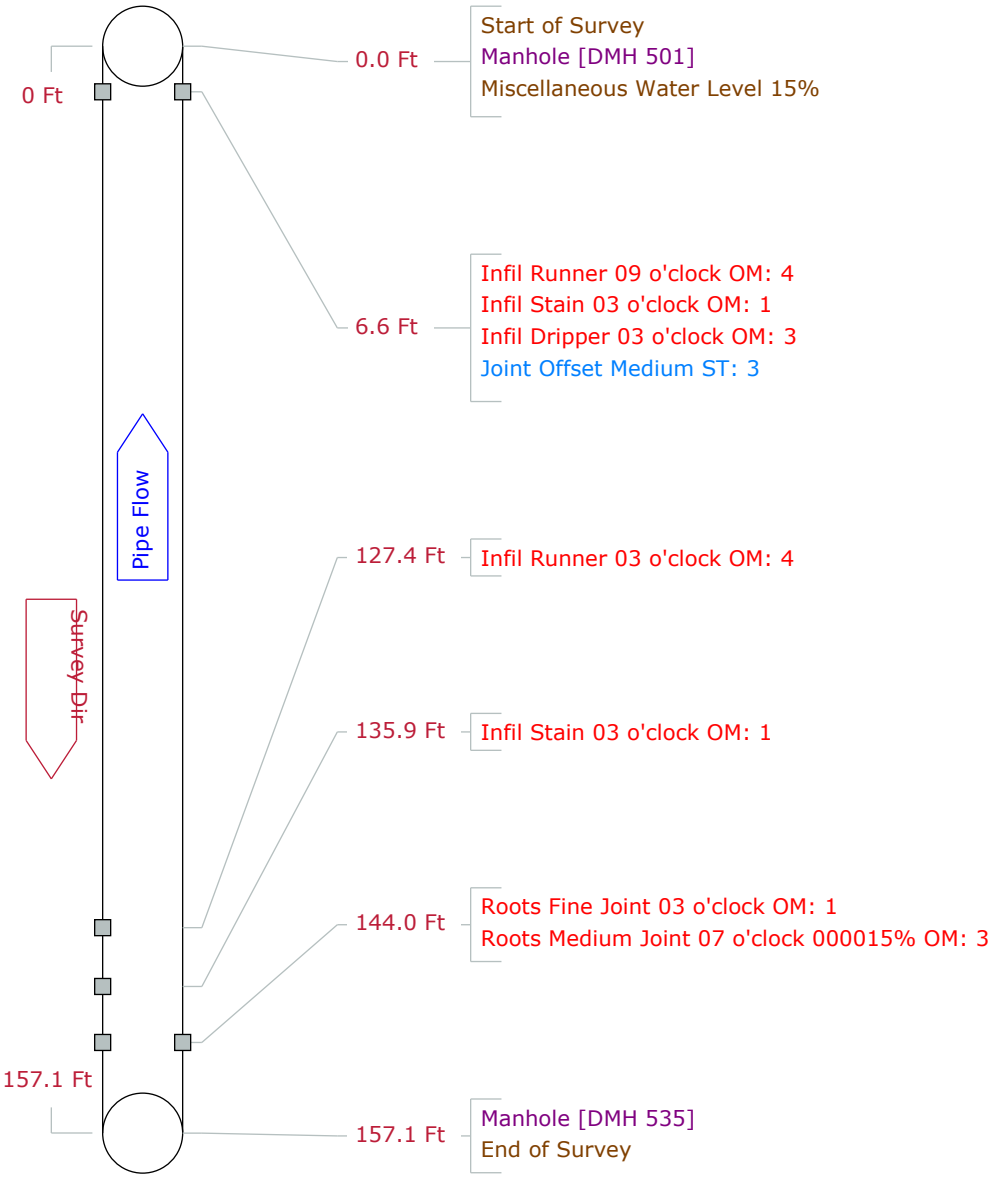
Fax:760-406-6023

Pipe Graphic Report of PLR DMH 535 X for Woodard and Curran

Setup 1	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/04	**Time** 8:49	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Upstream
Street Cambridge St.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 20	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 157.1 Ft	Structural	O & M
Length Surveyed 157.10 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 535	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 501	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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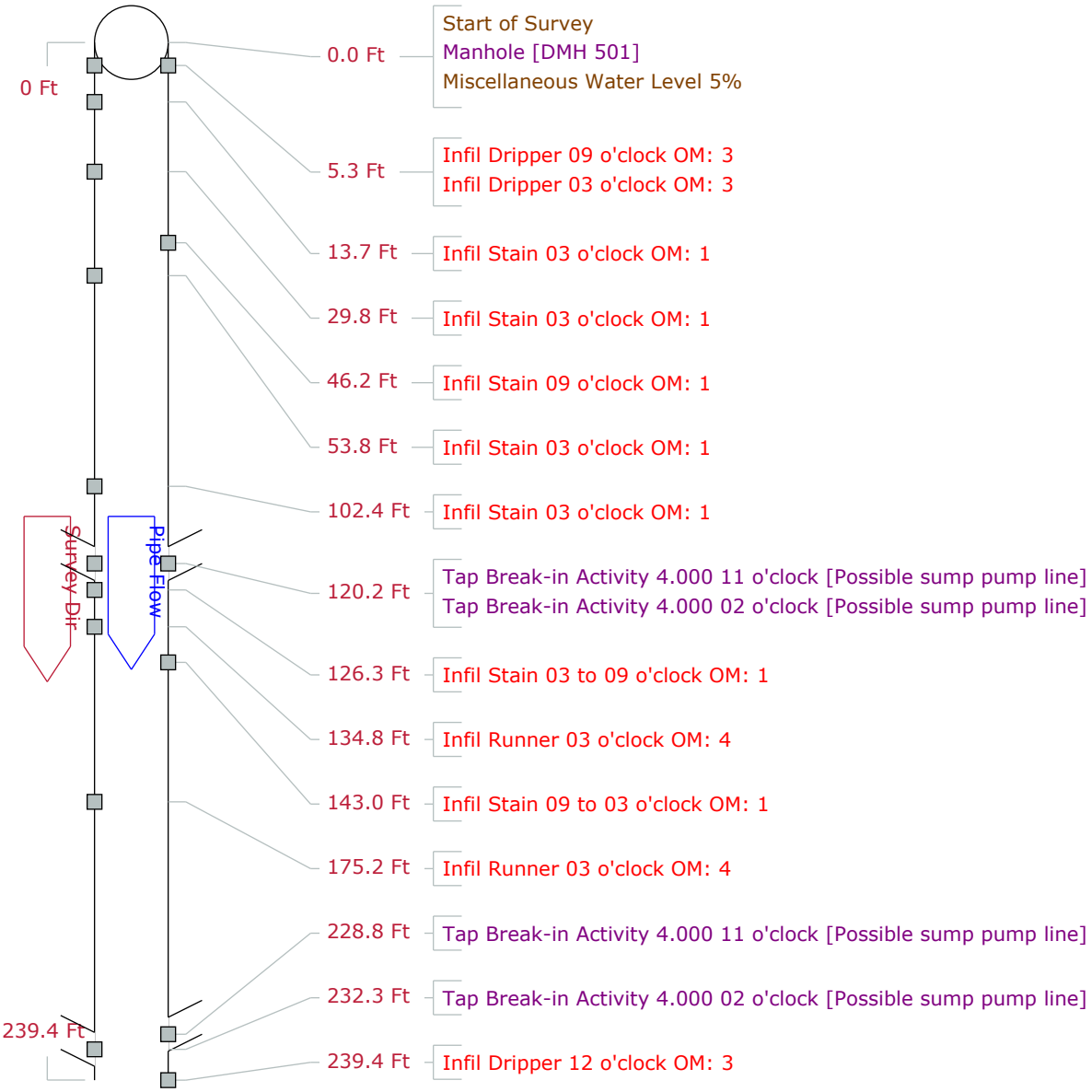
Fax:760-406-6023

Pipe Graphic Report of PLR DMH 501 X for Woodard and Curran

Setup 2	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/04	**Time** 9:12	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Columbia Dr			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 24	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 344.4 Ft	Structural	O & M
Length Surveyed	344.40 Ft	**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up	DMH 501	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 612	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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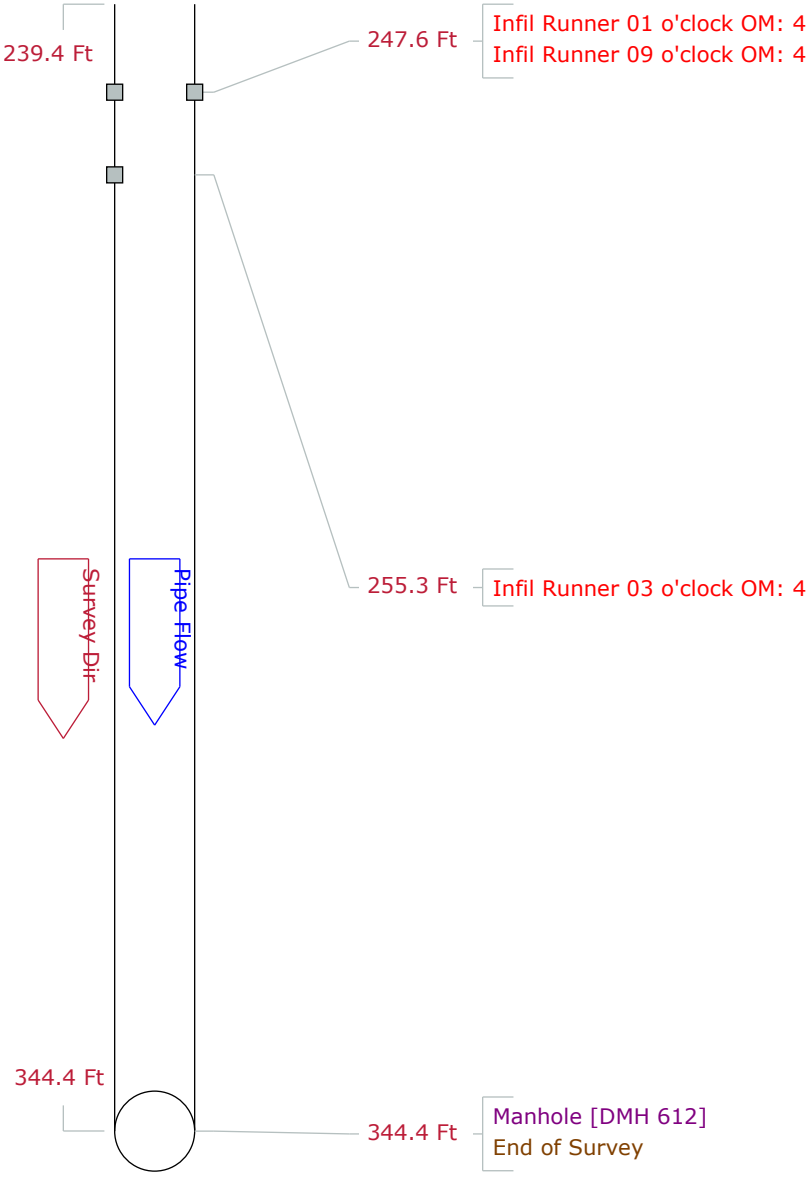
Pipe Graphic Report of PLR DMH 501 X for Woodard and Curran

Setup 2	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/04	**Time** 9:12	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Columbia Dr			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 24	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 344.4 Ft	Structural	O & M
Length Surveyed 344.40 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 501	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 612	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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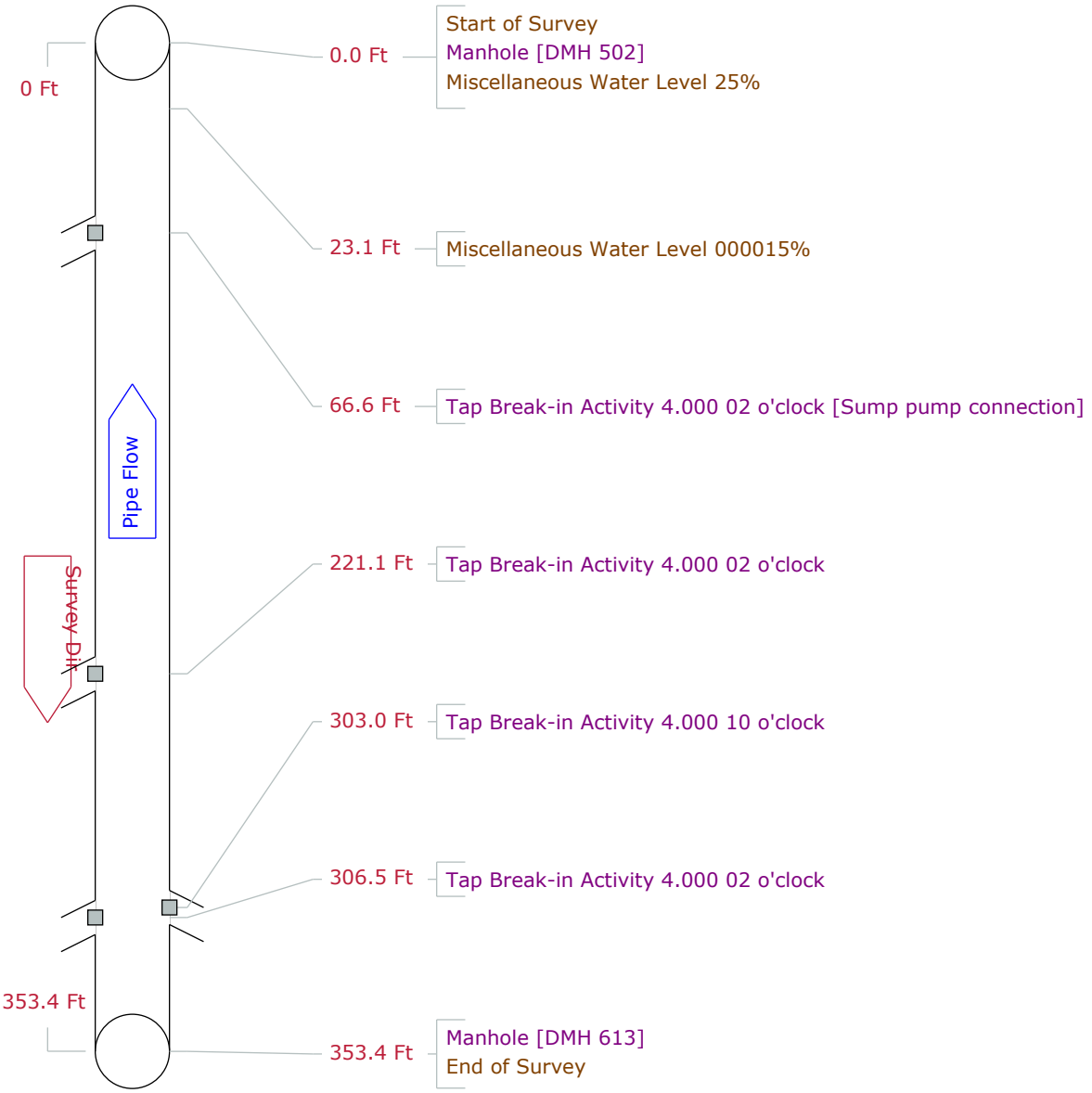
Pipe Graphic Report of PLR DMH 613 X for Woodard and Curran

Setup 4	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/04	**Time** 10:18	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Upstream
Street Columbia Dr			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 24	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 353.4 Ft	Structural	O & M
Length Surveyed 353.40 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 613	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 502	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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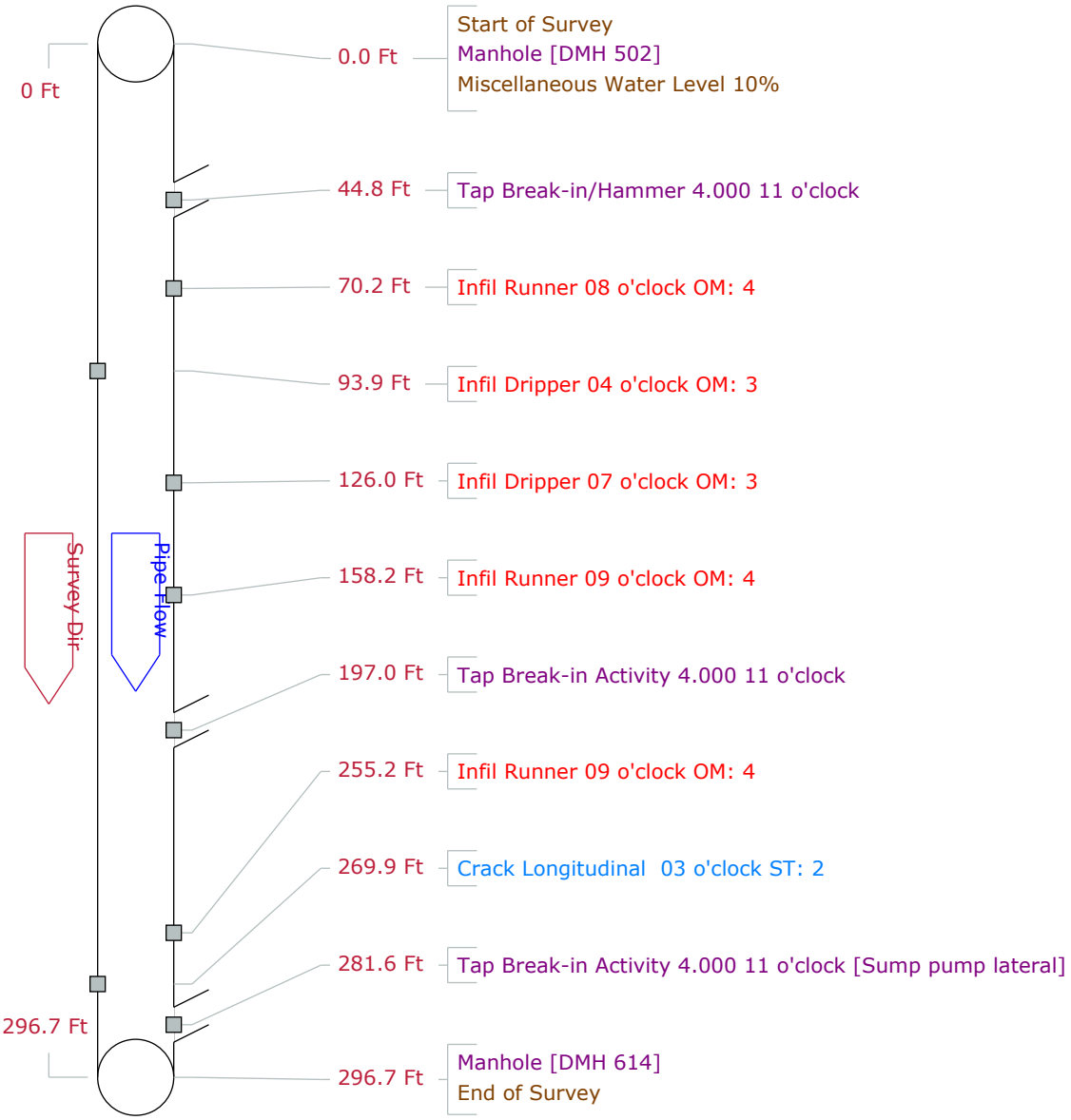
Pipe Graphic Report of PLR DMH 502 X for Woodard and Curran

Setup 5	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/04	**Time** 10:41	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Columbia Dr			**City** Agawam		**Drainage area**
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height** 24	**Width** ins
Shape Circular		**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 296.7 Ft	Structural	O & M
Length Surveyed	296.70 Ft	**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up	DMH 502	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 614	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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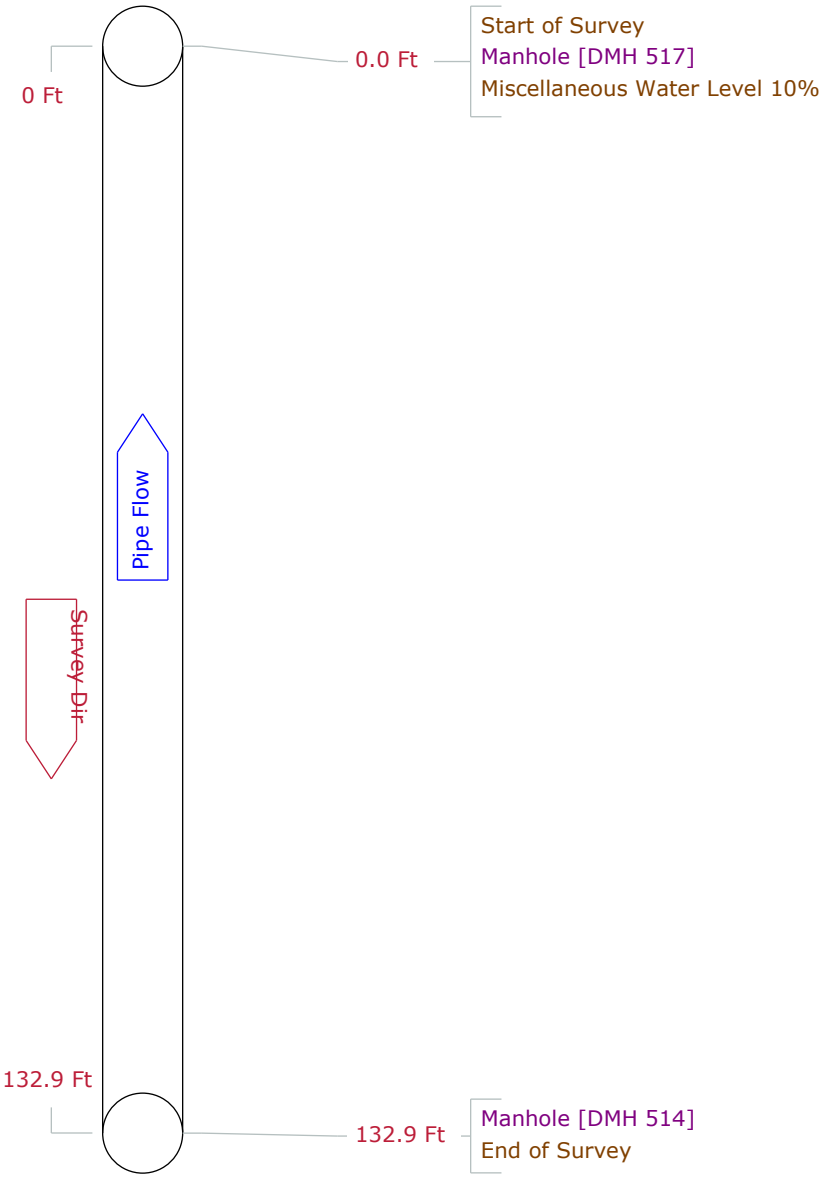
Pipe Graphic Report of PLR DMH 514 X for Woodard and Curran

Setup	62	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/14	**Time**	9:04	**Weather**	
Pre-Cleaning	N	**Date Cleaned**		**Flow control**	
Survey Purpose		**Direction**	Upstream		
Street	North Westfield St.	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	36	**Width**	ins
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	132.9 Ft
Length Surveyed	132.90 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 514	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 517	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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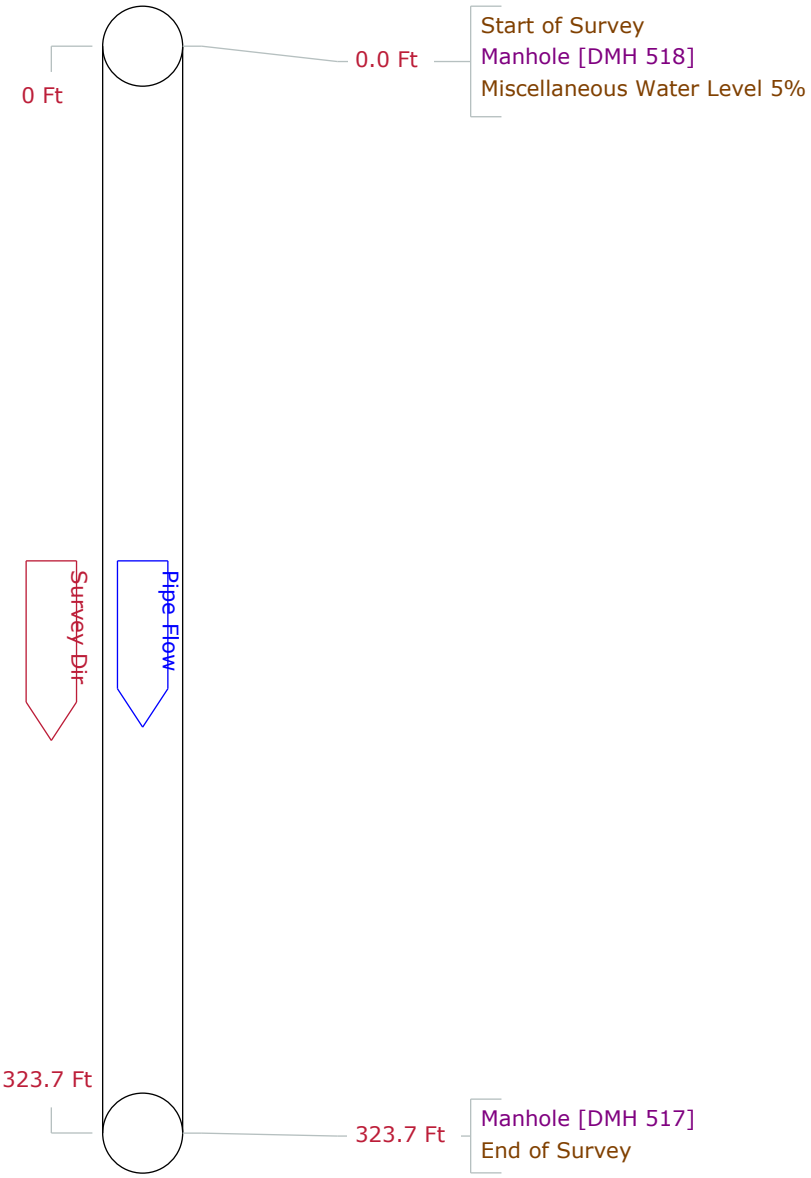
Pipe Graphic Report of PLR DMH 518 X **for** **Woodard and Curran**

Setup	61	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/14	**Time**	8:59	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	North Westfield St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	36
Width	**ins**				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	323.7 **Ft**
Length Surveyed	323.70 **Ft**	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 518	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 517	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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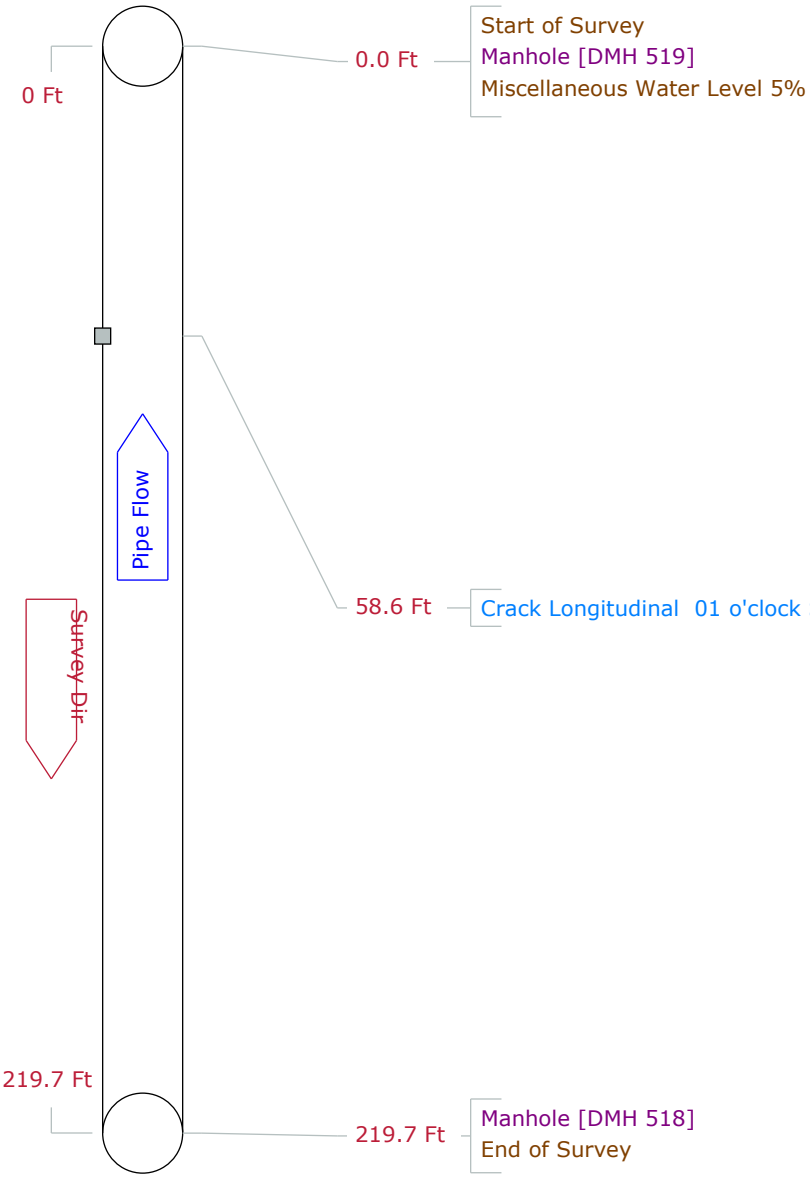
Pipe Graphic Report of PLR DMH 518 X for Woodard and Curran

Setup	60	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/14	**Time**	8:54	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	North Westfield St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	36
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	219.7 Ft
Length Surveyed	219.70 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 518	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 519	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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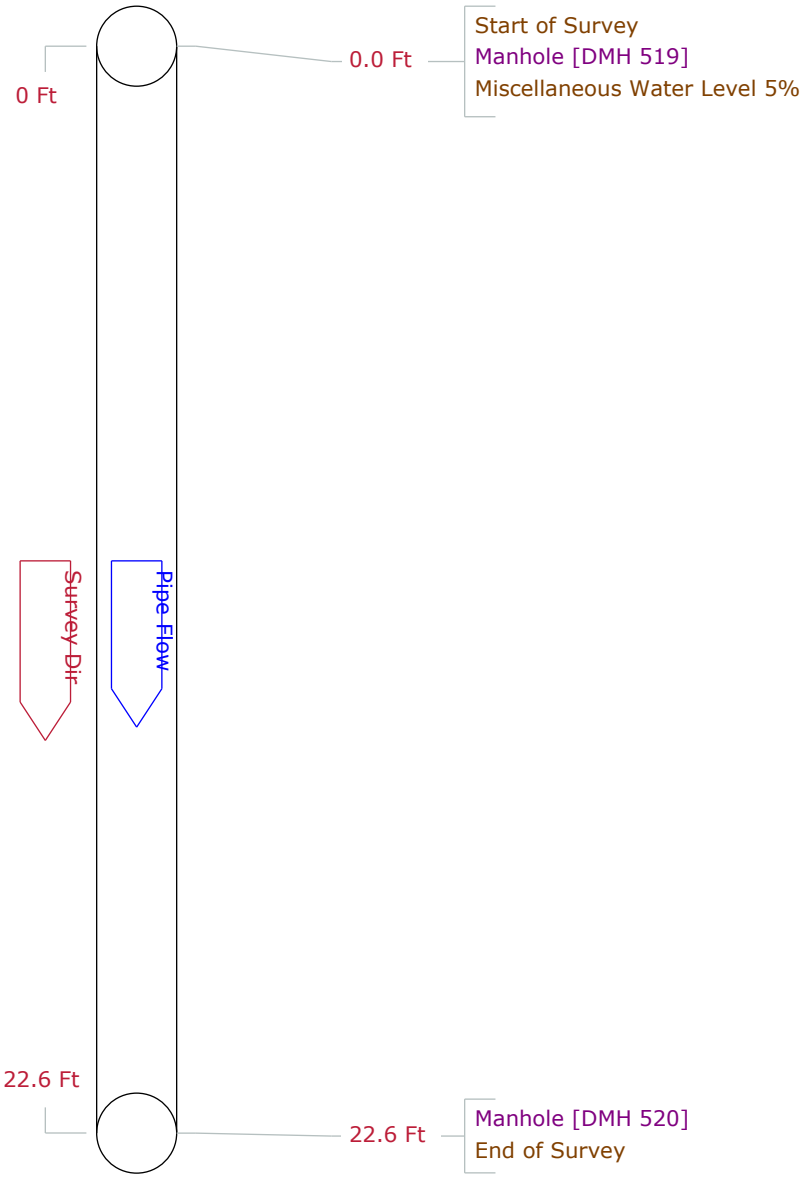
Pipe Graphic Report of PLR DMH 519 X for Woodard and Curran

Setup	57	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/14	**Time**	8:13	**Weather**	
Pre-Cleaning	N	**Date Cleaned**		**Flow control**	
Survey Purpose		**Direction**	Downstream		
Street	North Westfield St.	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	42	**Width**	ins
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	22.6 Ft
Length Surveyed	22.60 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 519	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 520	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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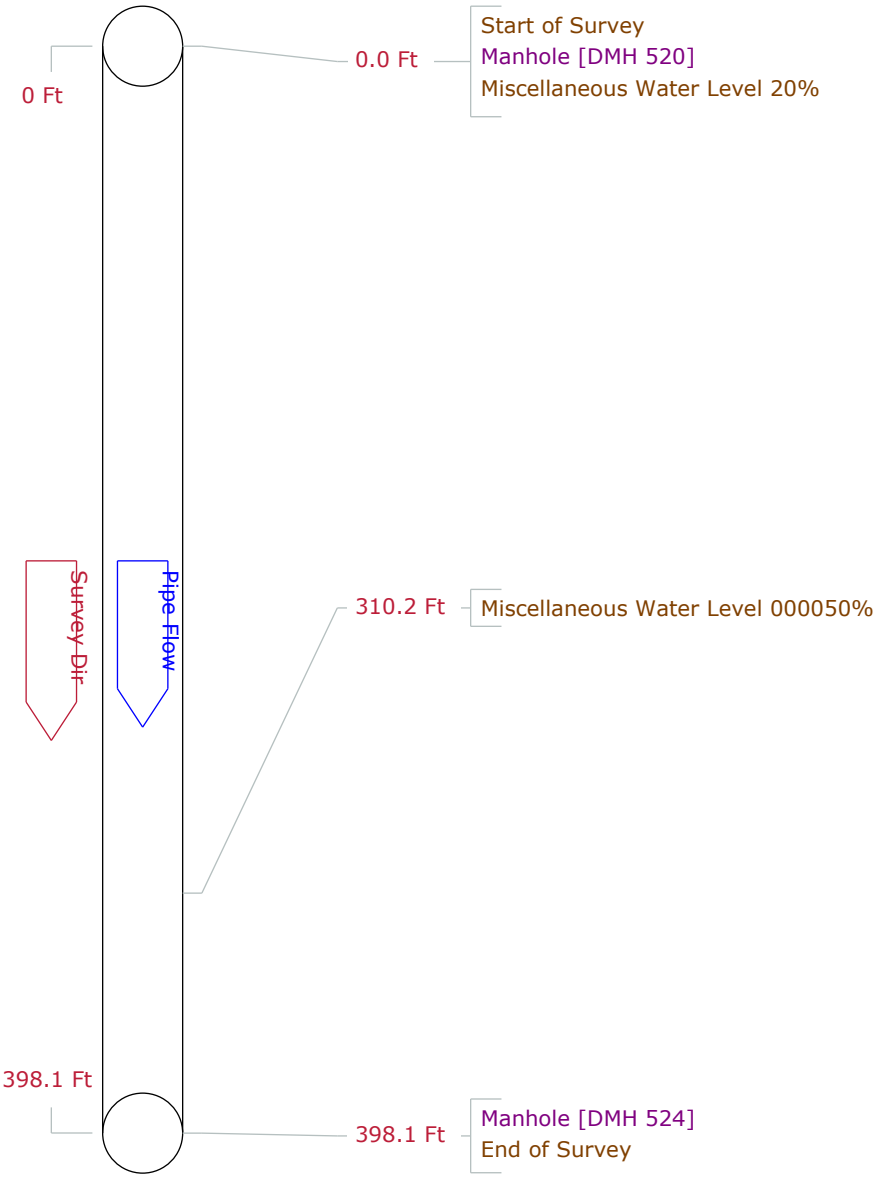
Pipe Graphic Report of PLR DMH 520 X for Woodard and Curran

Setup	58	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/14	**Time**	8:16	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	North Westfield St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	42
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	398.1 Ft
Length Surveyed	398.10 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 520	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 524	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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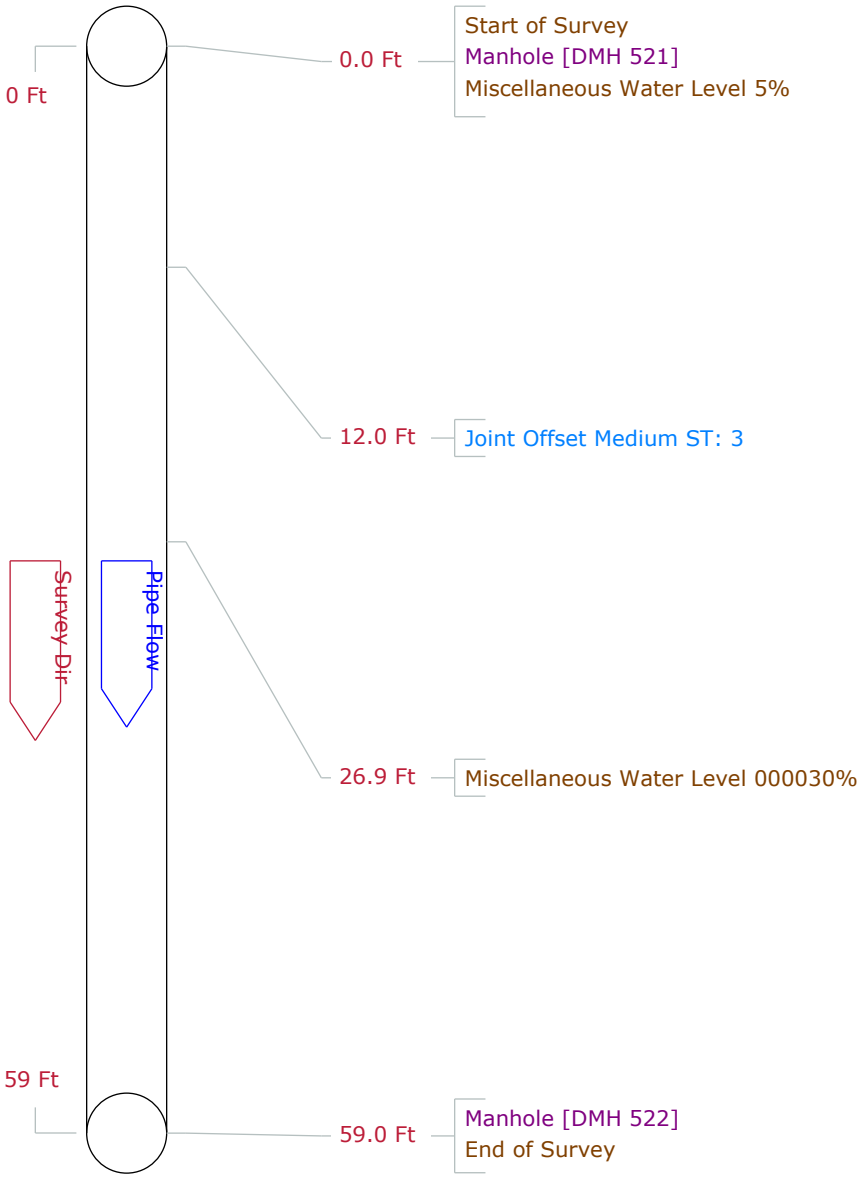
Pipe Graphic Report of PLR DMH 521 X for Woodard and Curran

Setup	42	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/12	**Time**	11:59	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	North Westfield St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	30
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	59.0 Ft
Length Surveyed	59.00 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 521	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 522	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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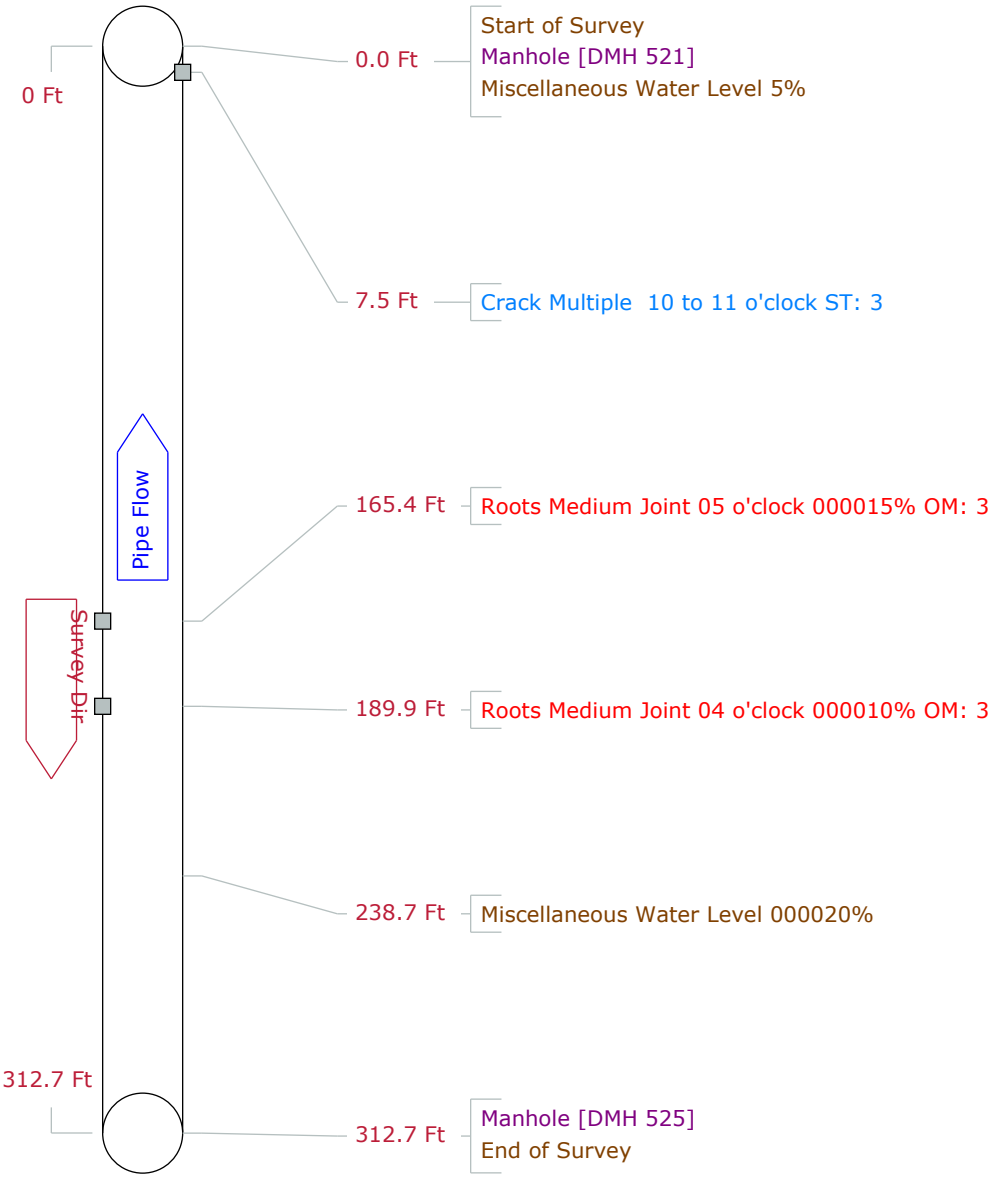
Pipe Graphic Report of PLR DMH 525 X for Woodard and Curran

Setup	40	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/12	**Time**	11:19	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	North Westfield St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	30
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	312.7 Ft
Length Surveyed	312.70 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 525	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 521	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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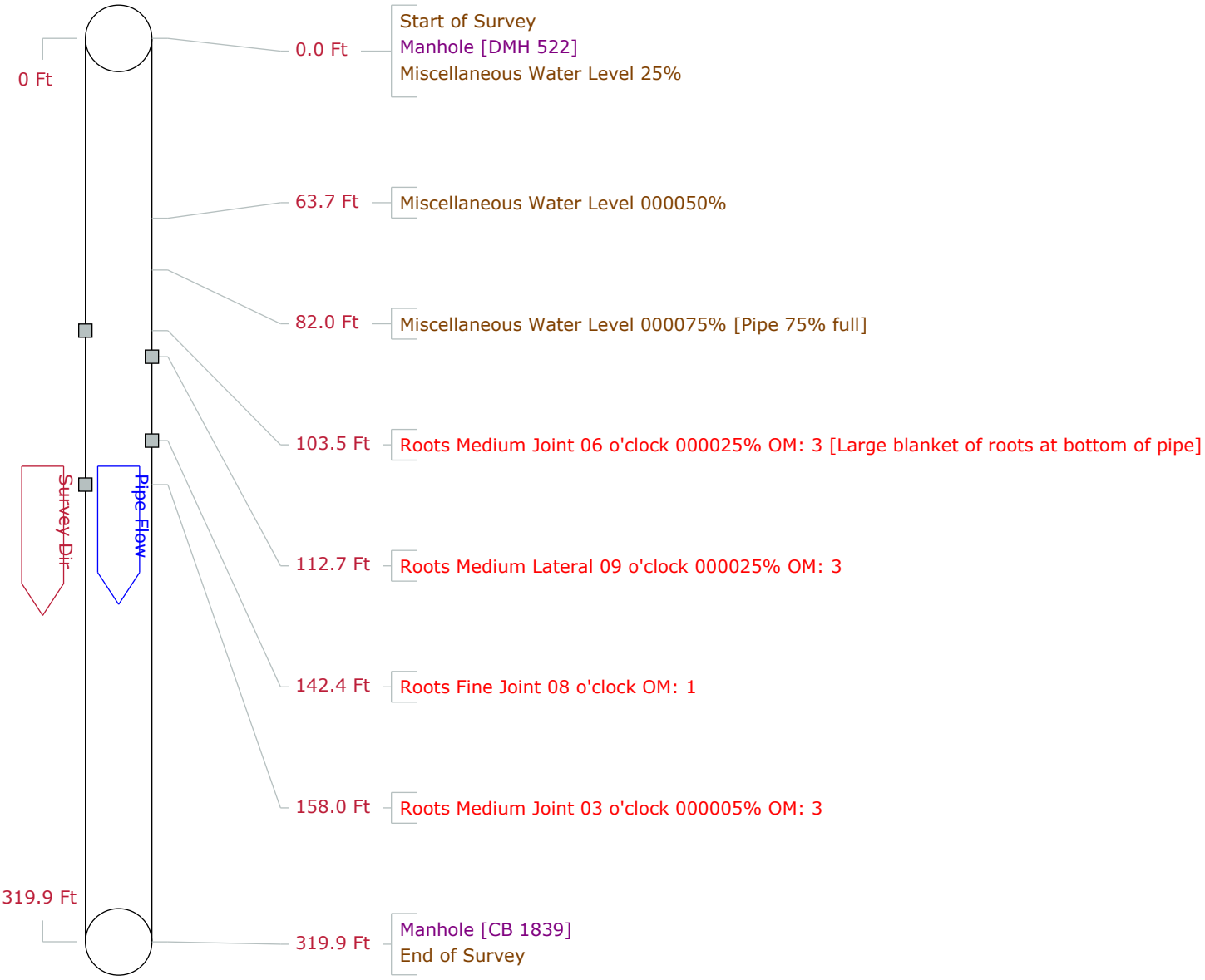
Pipe Graphic Report of PLR DMH 522 X for Woodard and Curran

Setup	38	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/12	**Time**	10:03	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	North Westfield St.	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	30	**Width**	ins
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	319.9 Ft
Length Surveyed	319.90 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 522	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	CB 1839	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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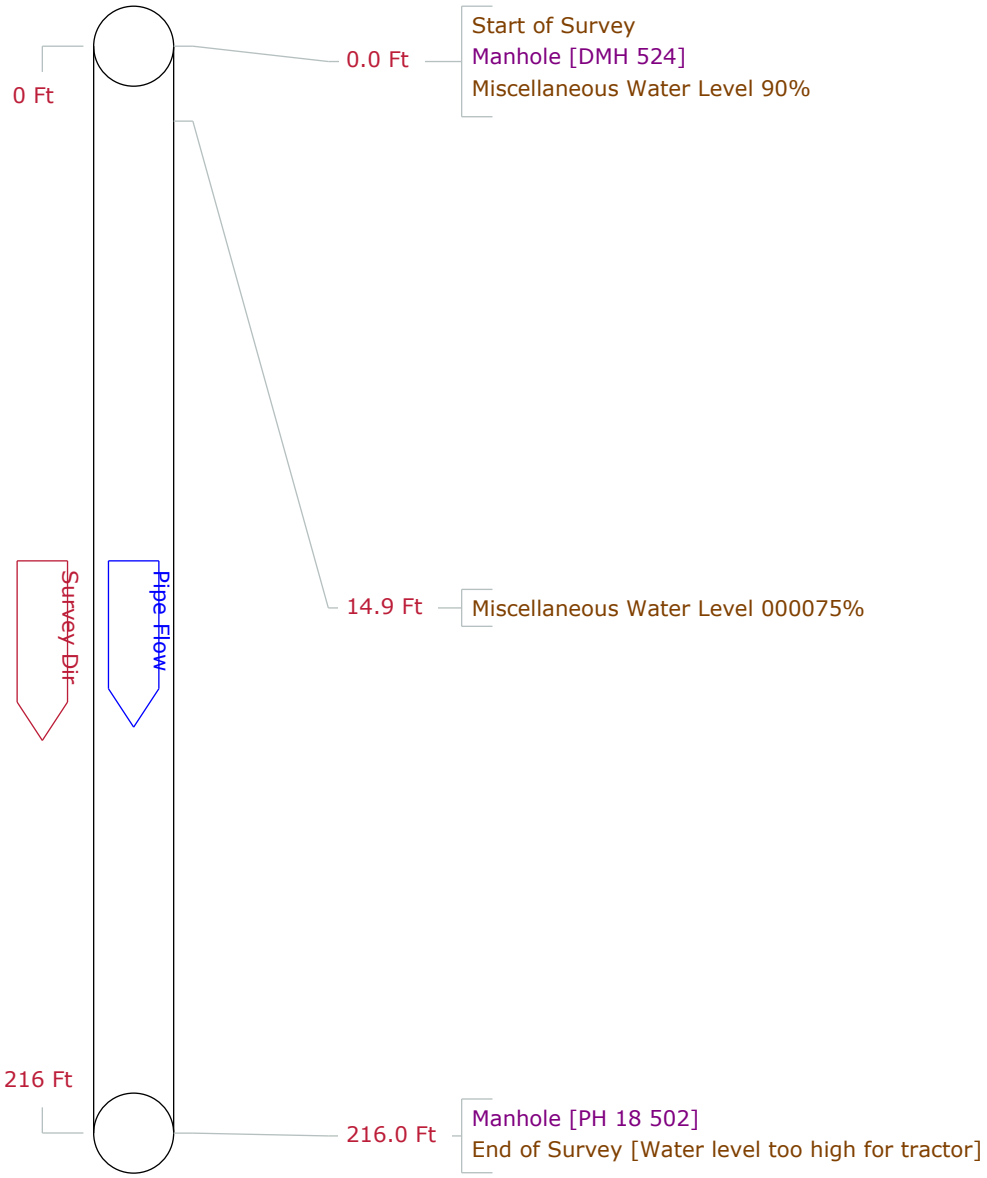
Pipe Graphic Report of PLR DMH 524 X for Woodard and Curran

Setup 59	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/14	**Time** 8:24	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street North Westfield St.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 48	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 216.0 Ft	Structural	O & M
Length Surveyed 216.00 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 524	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down PH 18 502	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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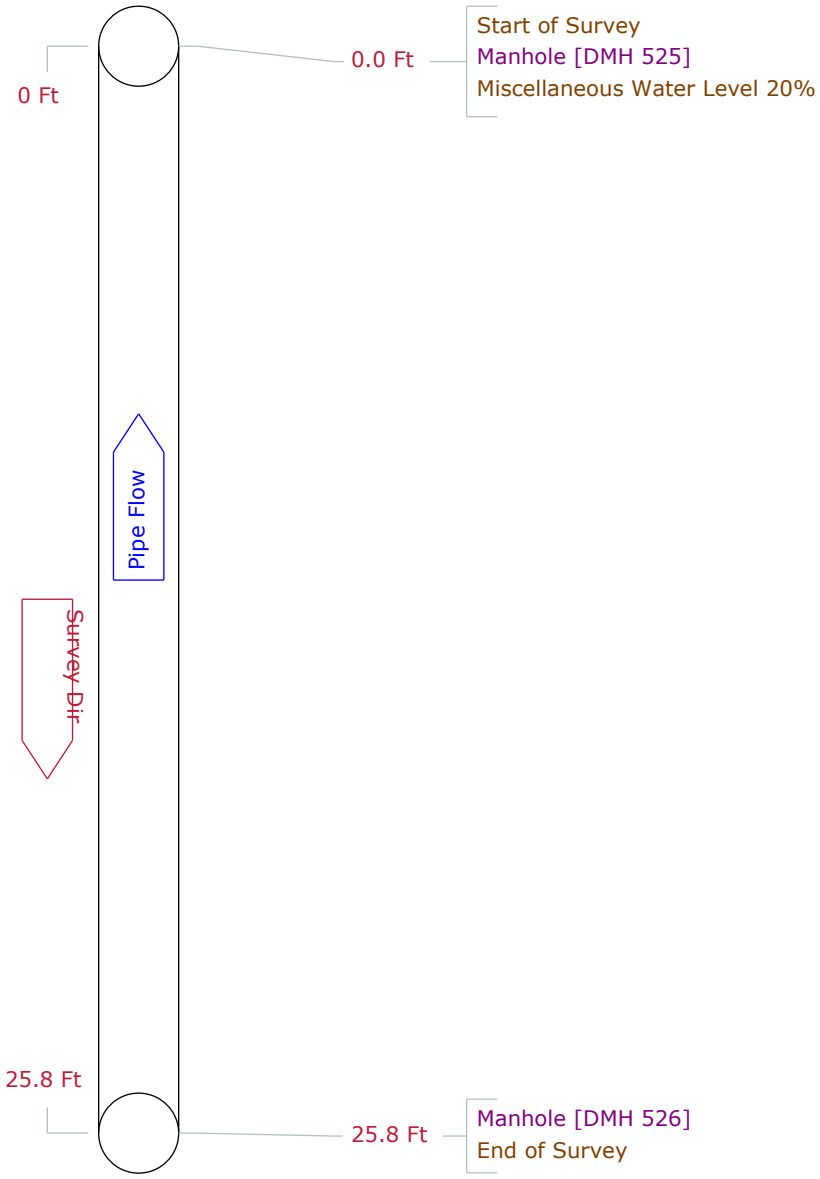
Fax:760-406-6023

Pipe Graphic Report of PLR DMH 526 X for Woodard and Curran

Setup	41	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/12	**Time**	11:42	**Weather**	
Pre-Cleaning	N	**Date Cleaned**		**Flow control**	
Survey Purpose		**Direction**	Upstream		
Street	North Westfield St.	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	30	**Width**	ins
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	25.8 Ft
Length Surveyed	25.80 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 526	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 525	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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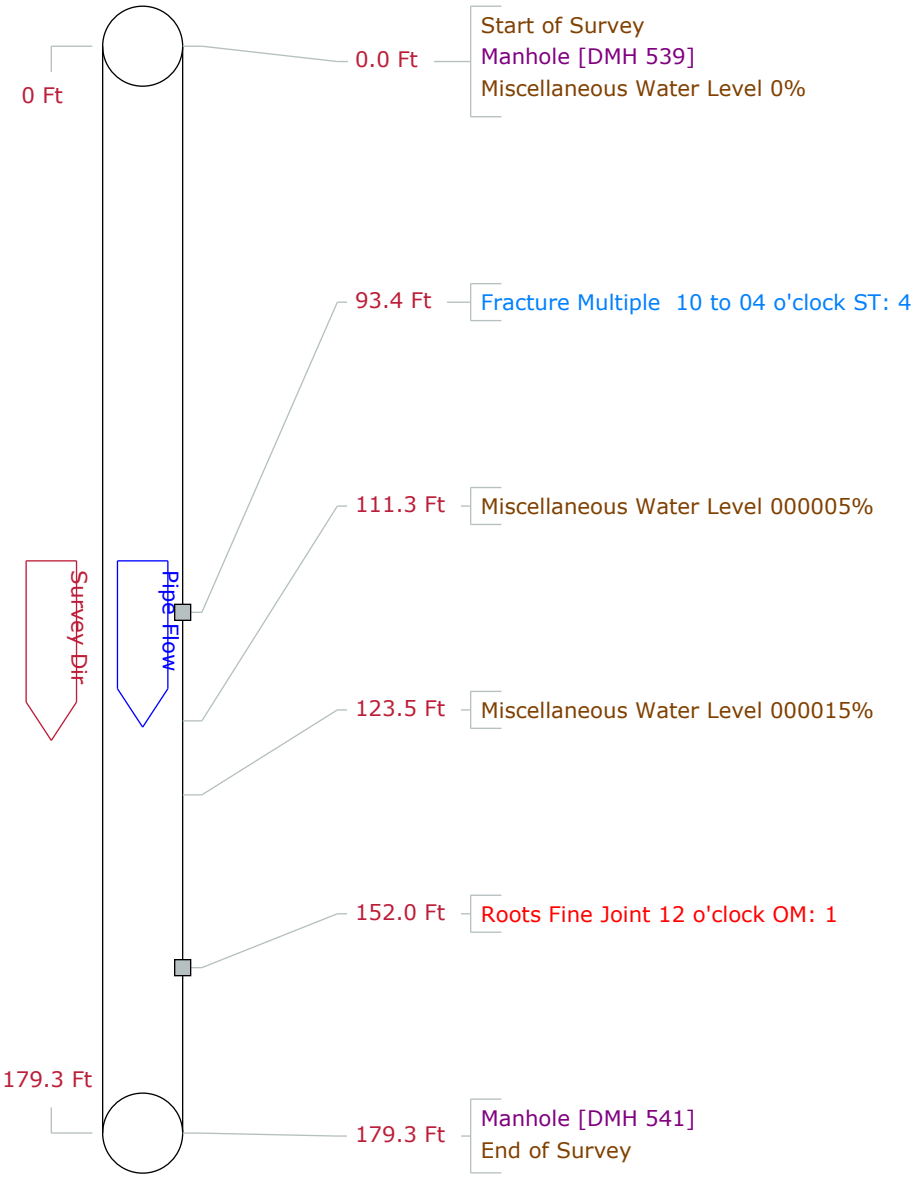
Pipe Graphic Report of PLR DMH 539 X for Woodard and Curran

Setup	94	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/20	**Time**	13:42	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Memorial Dr	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	12
Width	ins				
Shape	Circular	**Material**	Vitrified Clay Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	179.3 Ft
Length Surveyed	179.30 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 539	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 541	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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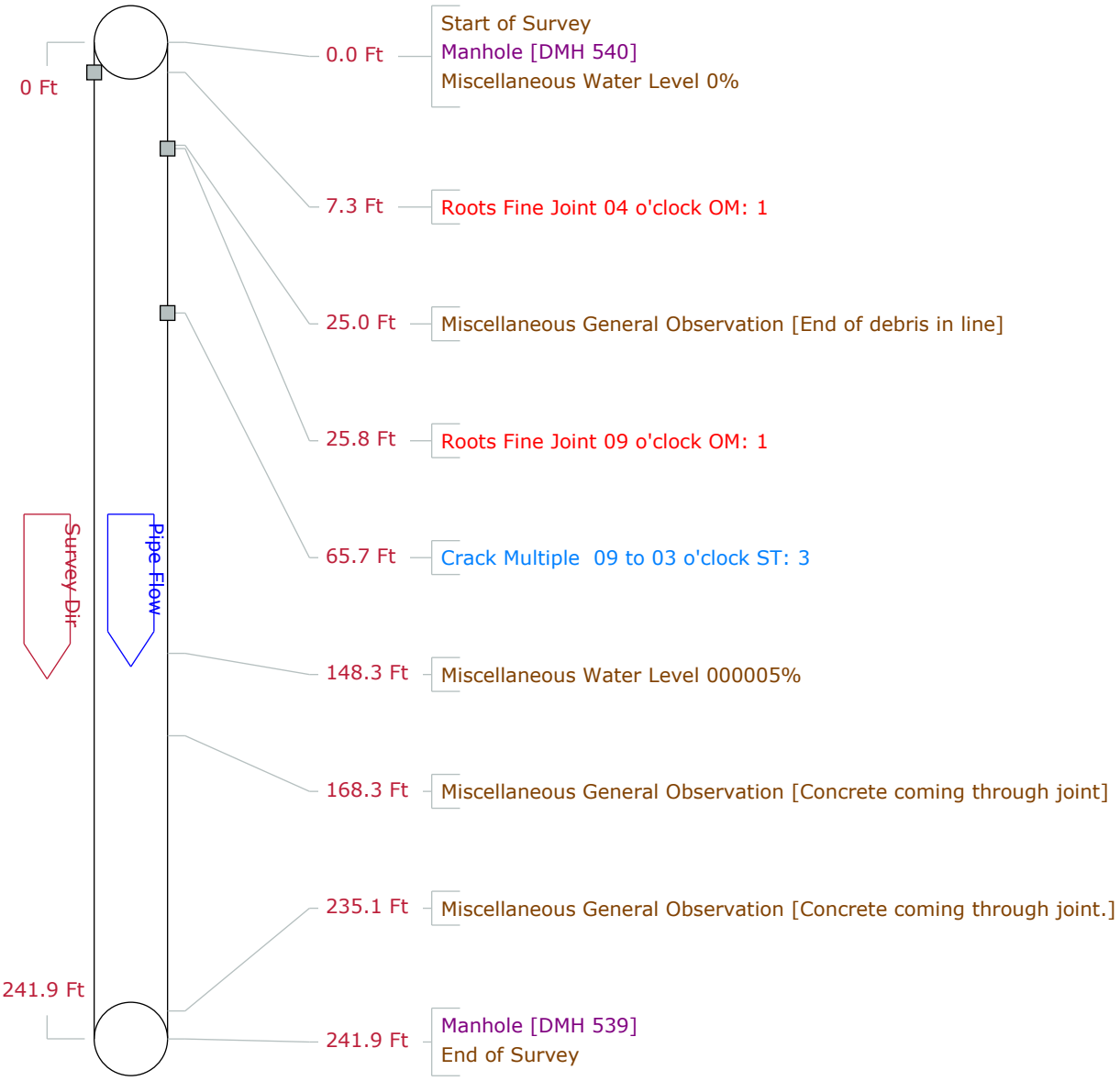
Pipe Graphic Report of PLR DMH 540 X for Woodard and Curran

Setup	95	**Surveyed By**	ZC	**Certificate #**	614-06021733	**Owner**	
Reviewed By		**Reviewer #**		**Work Order**			
Customer				**P/O #**			
Media Label		**Project**	Agawam Storm Drain CCTV Investigation				
Date	2021/01/21	**Time**	7:50	**Weather**		**Pre-Cleaning**	N
Date Cleaned							
Flow control		**Survey Purpose**				**Direction**	Downstream
Street	Memorial Dr			**City**	Agawam	**Drainage area**	
Location Code						**Pipe Use**	Stormwater Pipe
Location details						**Height**	10 **Width** ins
Shape	Circular			**Material**	Reinforced Concrete Pipe	**Lining**	
Coating				**Pipe Joint length**	Ft **Total length** 241.9 Ft	Structural	O & M
Length Surveyed	241.90 Ft	**Year Constructed**		**Year Renewed**		Miscellaneous	Constructional

Up	DMH 540	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 539	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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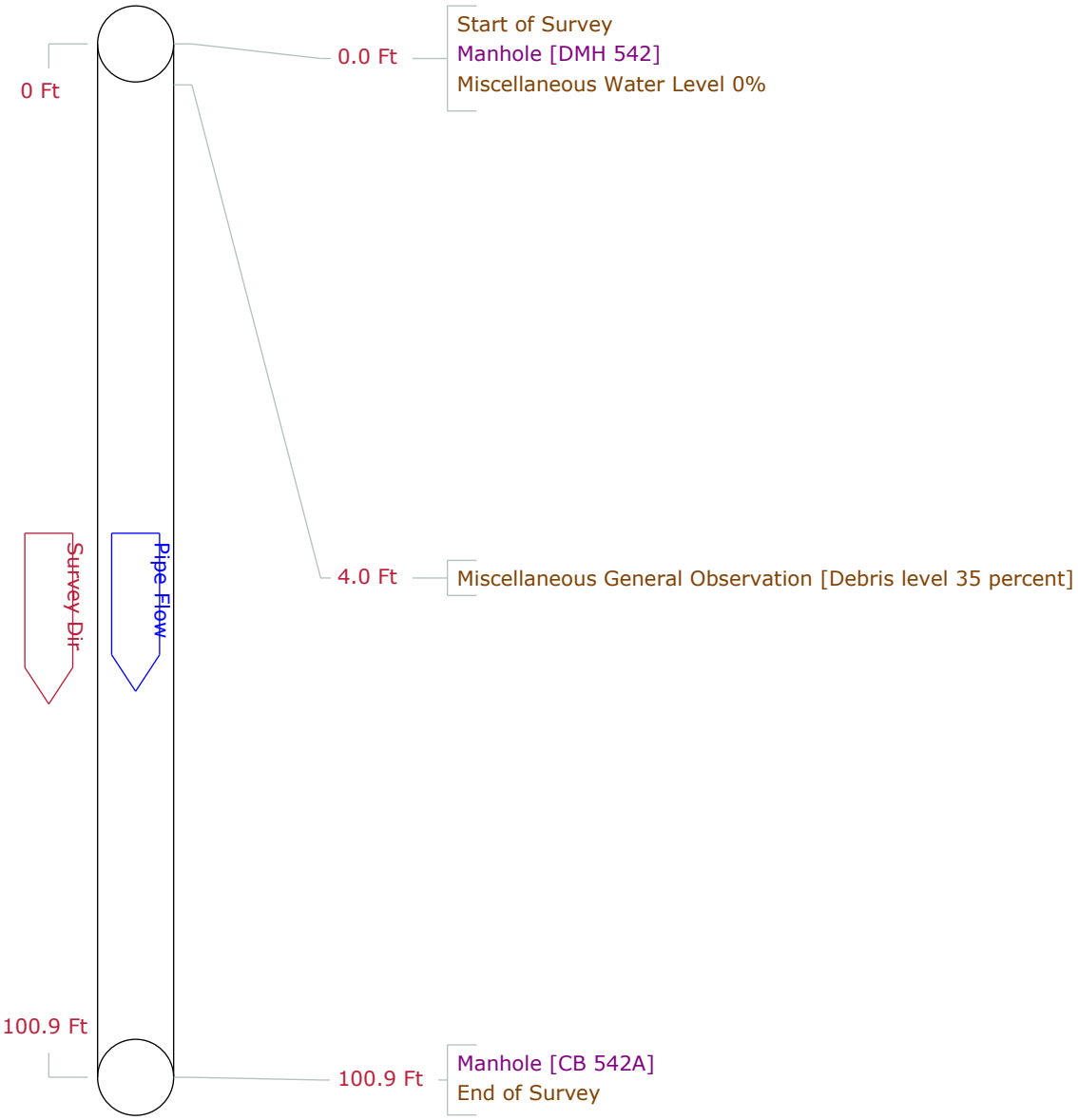
Pipe Graphic Report of PLR DMH 542 X **for** **Woodard and Curran**

Setup	99	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/21	**Time**	11:04	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Memorial Dr	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	18
Width		**ins**			
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	100.9 **Ft**
Length Surveyed	100.90 **Ft**	**Year Constructed**		**Year Renewed**	

Structural	O & M
Miscellaneous	Constructional

Up	DMH 542	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	CB 542A	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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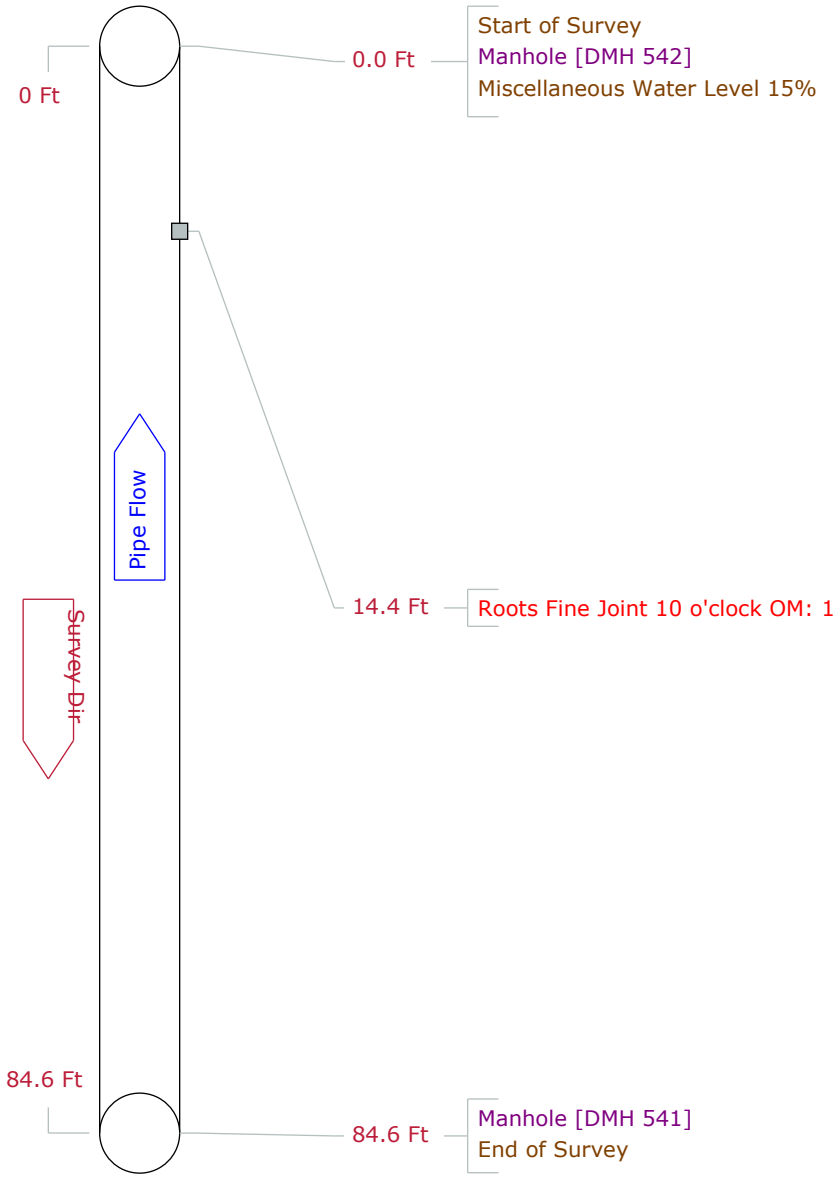
Pipe Graphic Report of PLR DMH 541 X for Woodard and Curran

Setup	98	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/21	**Time**	10:52	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	Memorial Dr	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	12
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	84.6 Ft
Length Surveyed	84.60 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 541	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 542	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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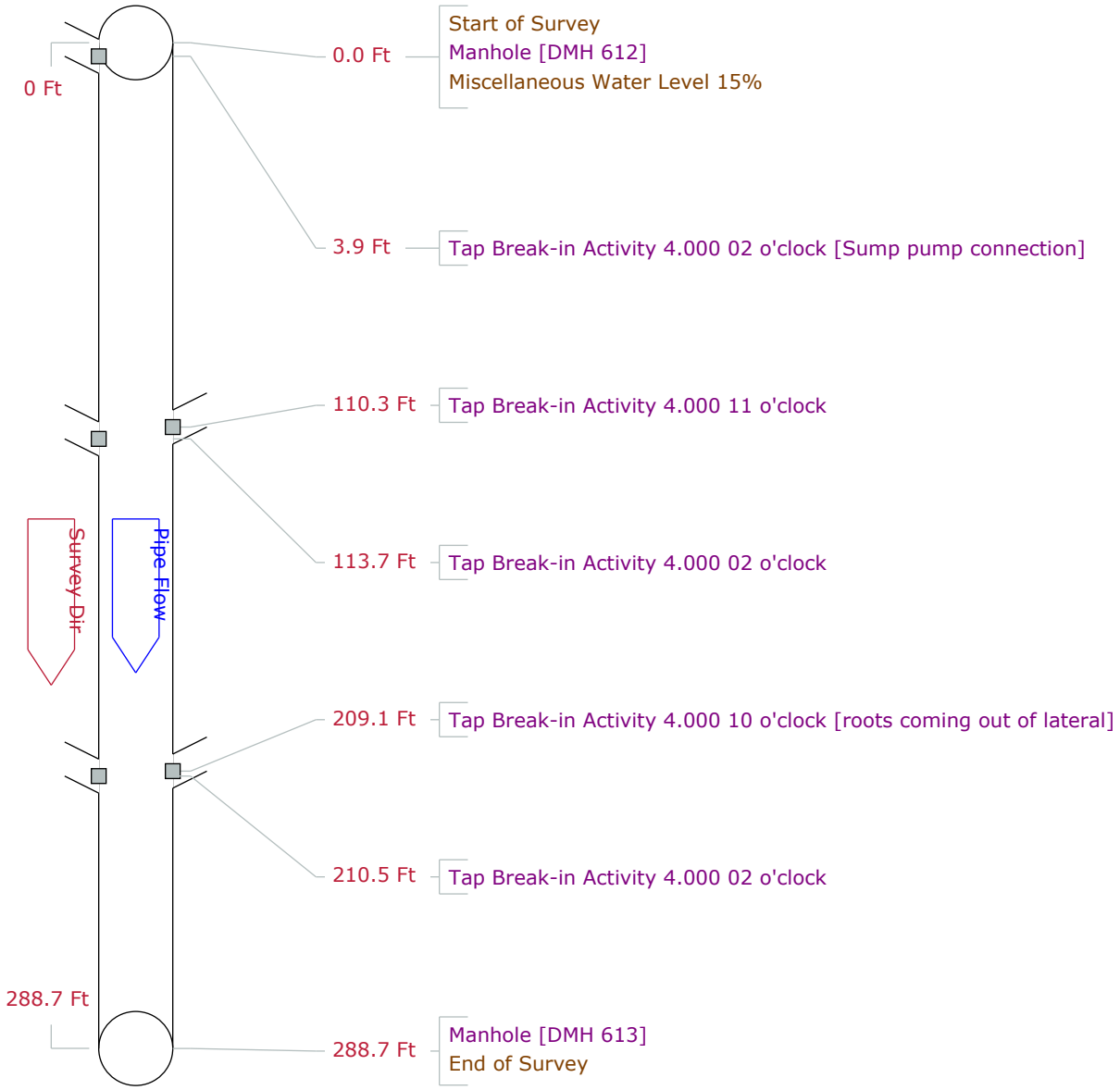
Pipe Graphic Report of PLR DMH 612 X for Woodard and Curran

Setup 3	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/04	**Time** 9:36	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Columbia Dr			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 24	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 288.7 Ft	Structural	O & M
Length Surveyed 288.70 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 612	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 613	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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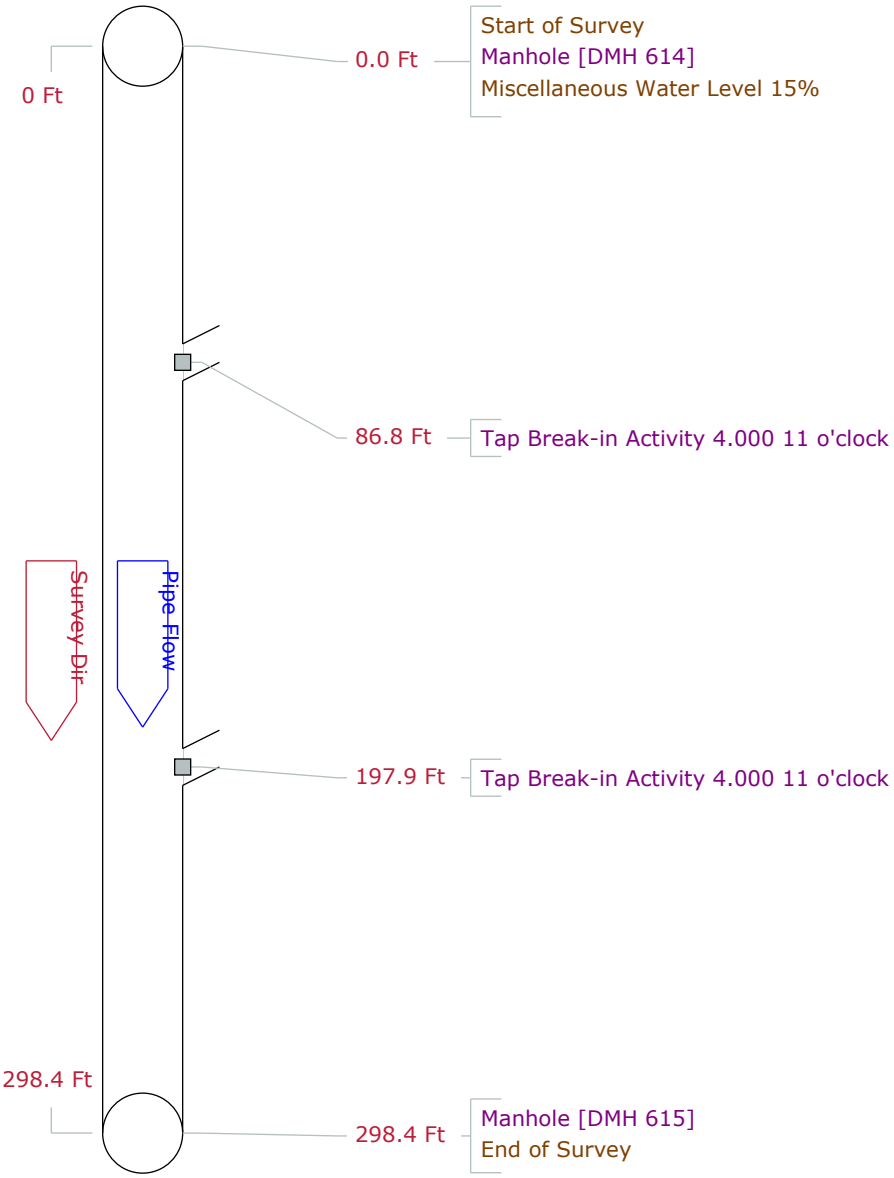
Pipe Graphic Report of PLR DMH 614 X for Woodard and Curran

Setup 6	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/04	**Time** 11:14	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Columbia Dr			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 30	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 298.4 Ft	Structural	O & M
Length Surveyed 298.40 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 614	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 615	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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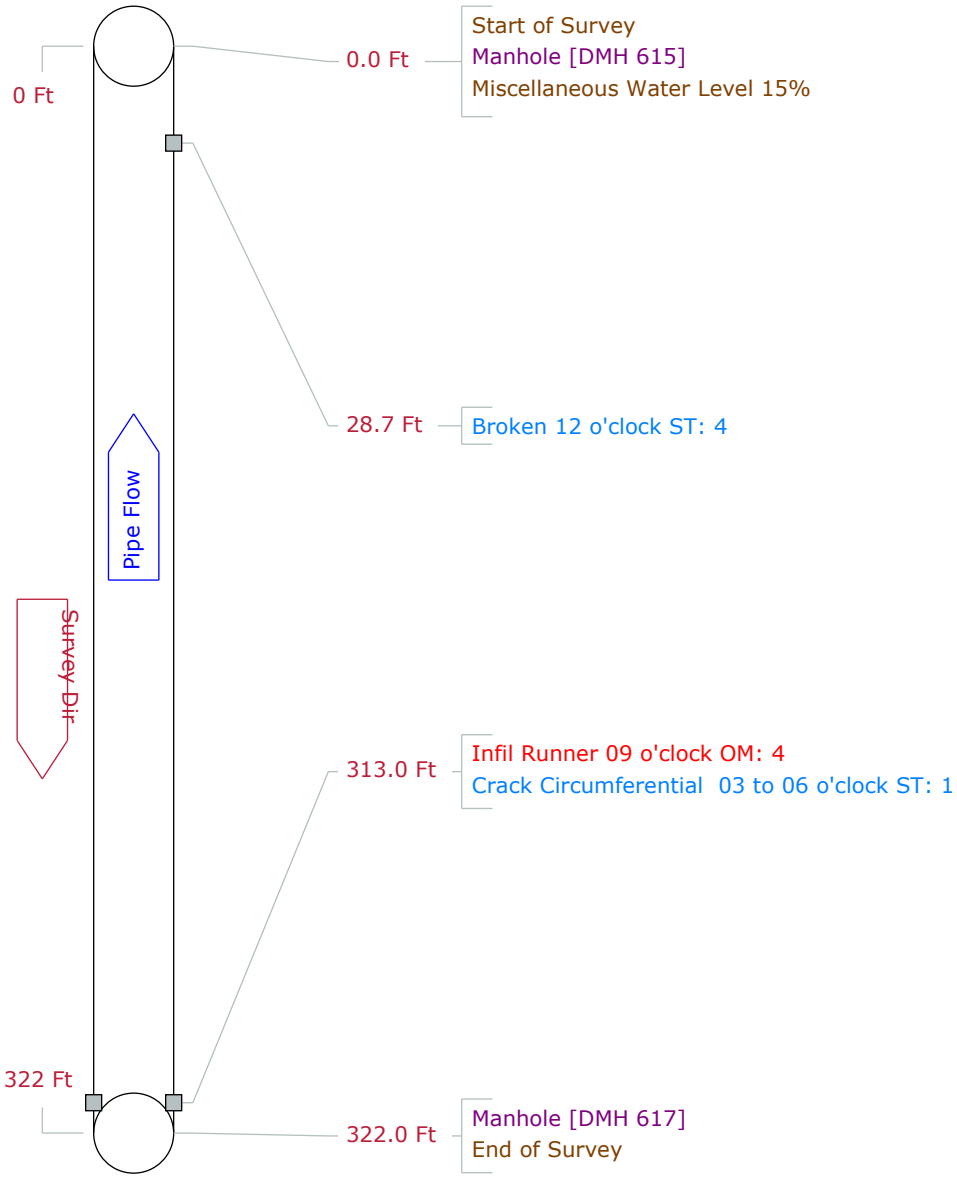
Pipe Graphic Report of PLR DMH 617 X for Woodard and Curran

Setup 7	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/04	**Time** 12:25	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Upstream
Street Vassar Rd.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 20	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 322.0 Ft	Structural	O & M
Length Surveyed 322.00 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 617	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 615	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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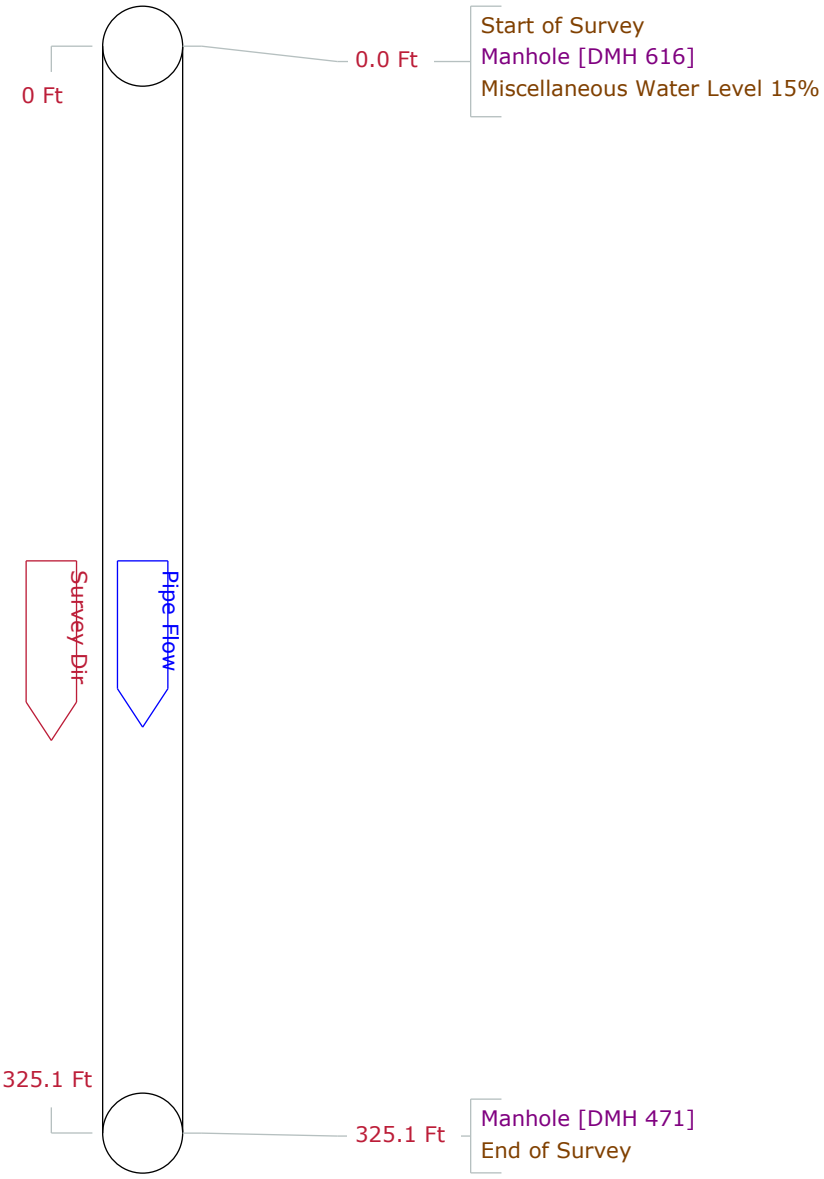
Pipe Graphic Report of PLR DMH 616 X for Woodard and Curran

Setup	10	**Surveyed By**	ZC	**Certificate #**	614-06021733	**Owner**	
Reviewed By		**Reviewer #**		**Work Order**			
Customer				**P/O #**			
Media Label		**Project**	Agawam Storm Drain CCTV Investigation				
Date	2021/01/05	**Time**	8:26	**Weather**		**Pre-Cleaning**	N
Date Cleaned							
Flow control		**Survey Purpose**				**Direction**	Downstream
Street	Princeton Ave.			**City**	Agawam	**Drainage area**	
Location Code						**Pipe Use**	Stormwater Pipe
Location details						**Height**	36
Width	ins						
Shape	Circular			**Material**	Reinforced Concrete Pipe	**Lining**	
Coating				**Pipe Joint length**	Ft	**Total length**	325.1 Ft
Length Surveyed	325.10 Ft	**Year Constructed**		**Year Renewed**			

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 616	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 471	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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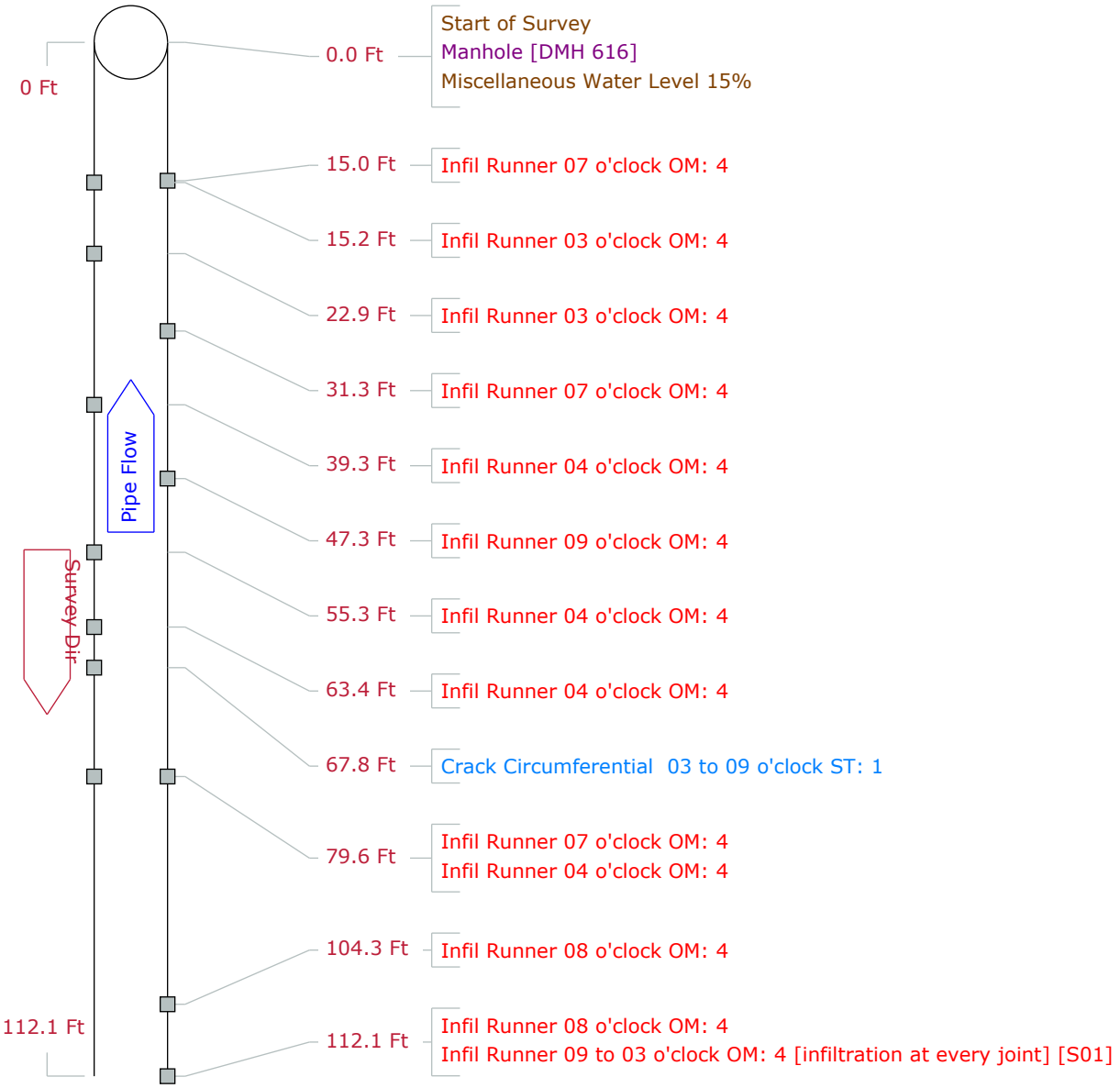
Pipe Graphic Report of PLR DMH 611 X **for** **Woodard and Curran**

Setup 9	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/05	**Time** 7:49	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Upstream
Street Vassar Rd.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 18	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 194.2 Ft	Structural	O & M
Length Surveyed	194.20 Ft	**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up	DMH 611	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 616	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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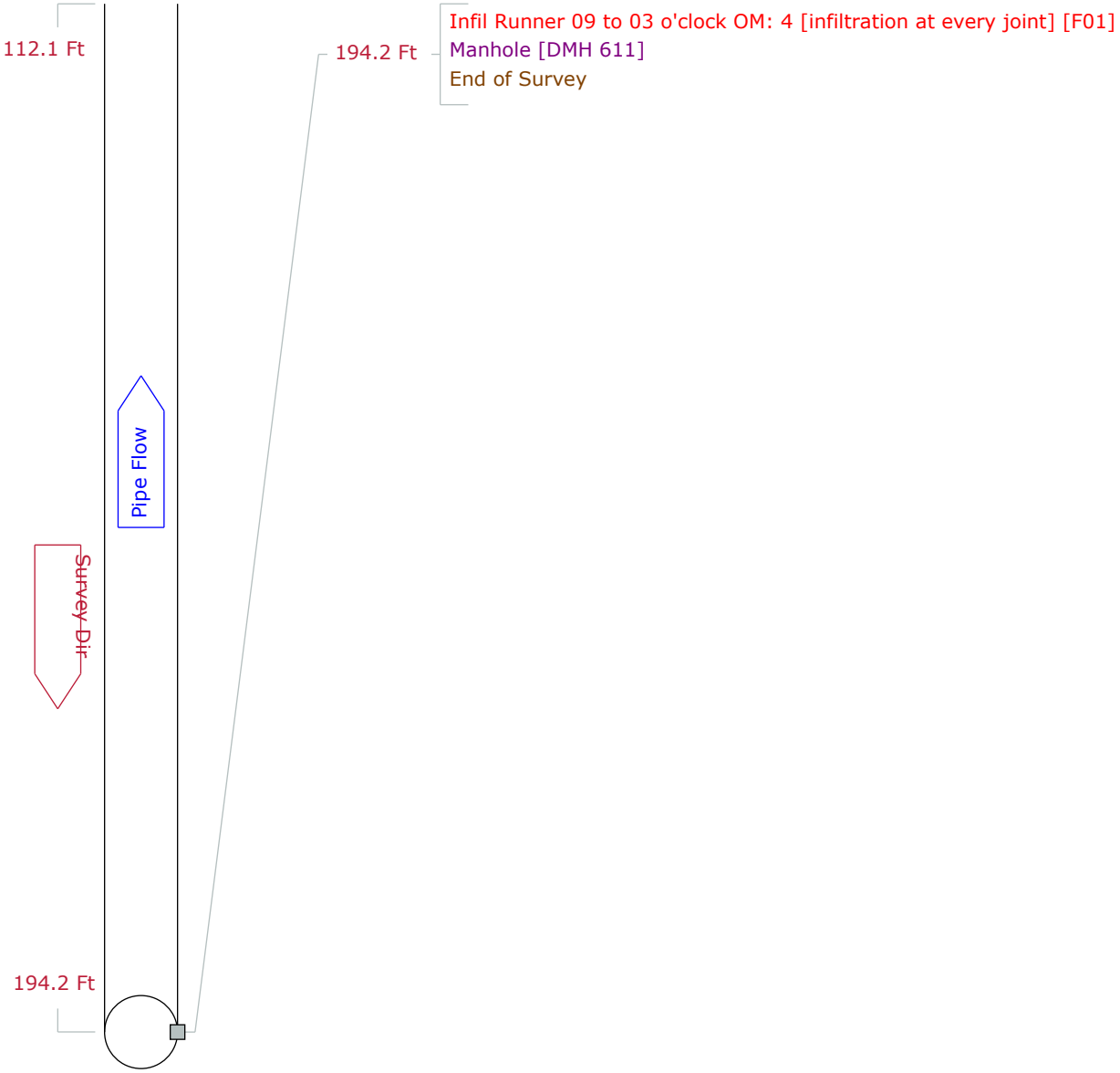
Pipe Graphic Report of PLR DMH 611 X for Woodard and Curran

Setup 9	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/05	**Time** 7:49	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Upstream
Street Vassar Rd.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 18	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 194.2 Ft	Structural	O & M
Length Surveyed 194.20 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 611	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 616	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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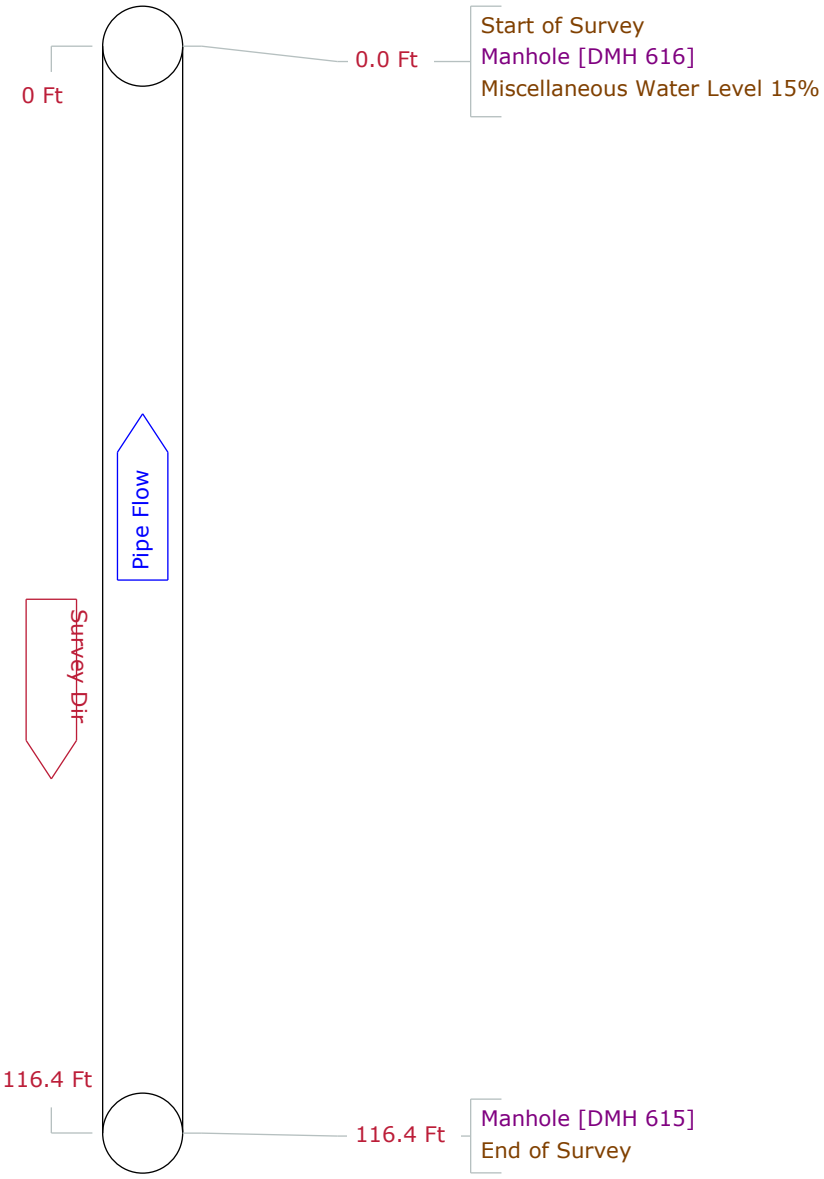
Pipe Graphic Report of PLR DMH 615 X for Woodard and Curran

Setup 8	**Surveyed By** ZC	**Certificate #** 614-06021733	**Owner**		
Reviewed By	**Reviewer #**	**Work Order**			
Customer		**P/O #**			
Media Label	**Project** Agawam Storm Drain CCTV Investigation				
Date 2021/01/04	**Time** 13:45	**Weather**	**Pre-Cleaning** N	**Date Cleaned**	
Flow control	**Survey Purpose**			**Direction** Upstream	
Street Vassar Rd.		**City** Agawam		**Drainage area**	
Location Code			**Pipe Use** Stormwater Pipe		
Location details			**Height** 36	**Width** ins	
Shape Circular	**Material** Reinforced Concrete Pipe		**Lining**		
Coating	**Pipe Joint length** Ft	**Total length** 116.4 Ft	Structural	O & M	
Length Surveyed 116.40 Ft	**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional	

Up DMH 615	**Rim to invert**	**Grade to invert**	**Rim to grade** Ft		
Down DMH 616	**Rim to invert**	**Grade to invert**	**Rim to grade** Ft		



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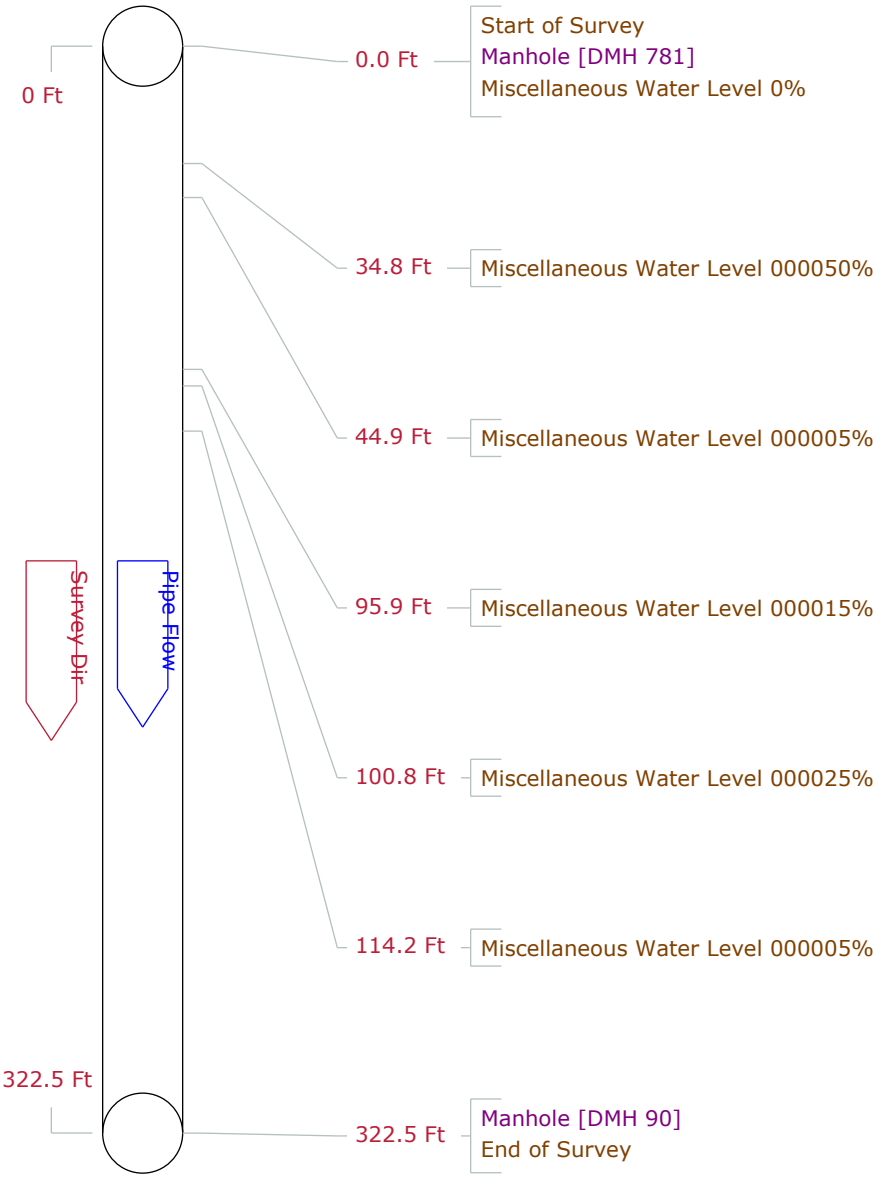
Pipe Graphic Report of PLR DMH 781 X for Woodard and Curran

Setup 89	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/20	**Time** 9:36	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Brookline Ave			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 12	**Width** ins
Shape Circular		**Material** Vitrified Clay Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 322.5 Ft	Structural	O & M
Length Surveyed 322.50 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 781	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 90	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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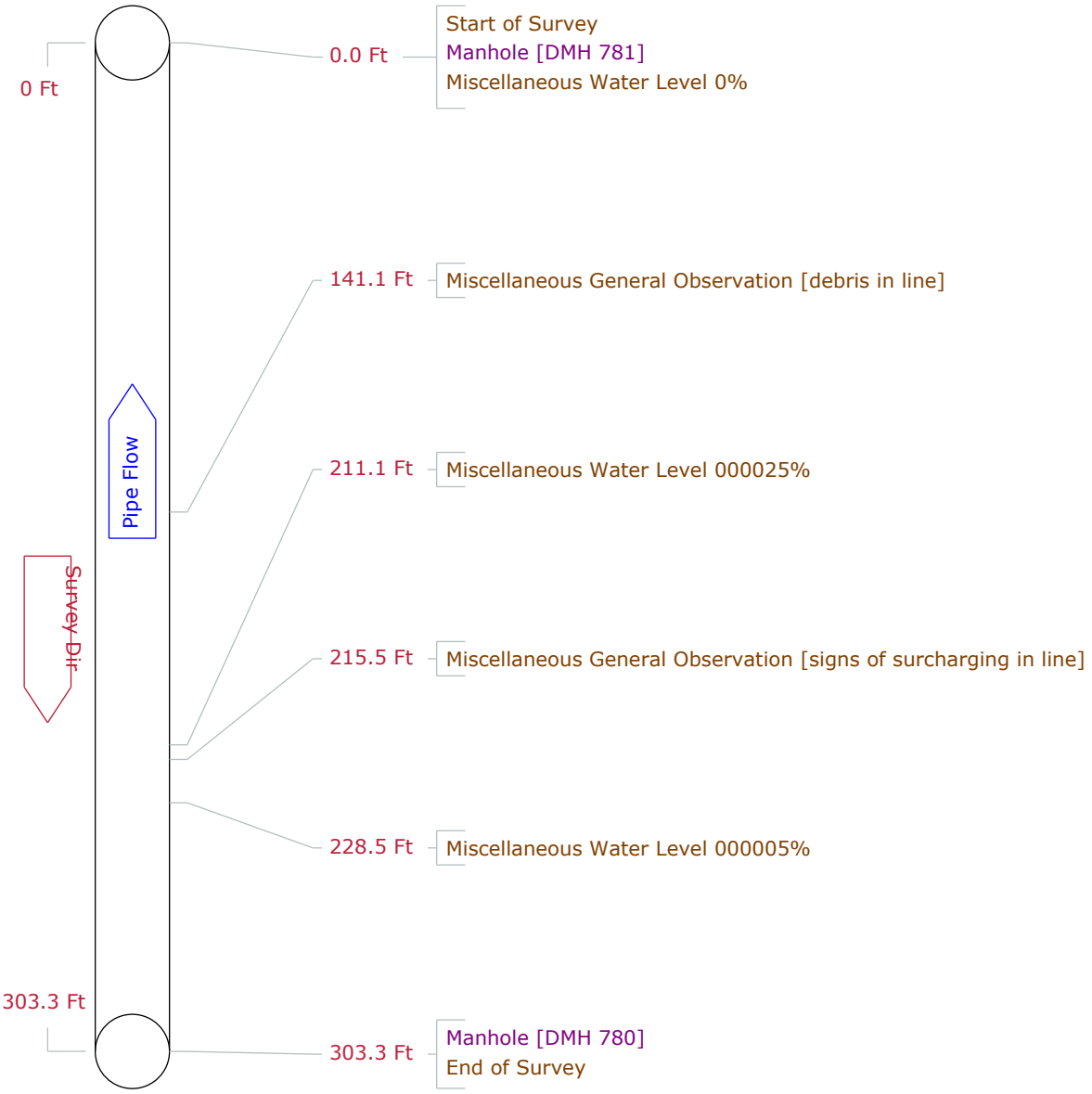
Pipe Graphic Report of PLR DMH 780 X for Woodard and Curran

Setup	88	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/20	**Time**	8:45	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	Brookline Ave	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	12
Width	ins				
Shape	Circular	**Material**	Vitrified Clay Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	303.3 Ft
Length Surveyed	303.30 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 780	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 781	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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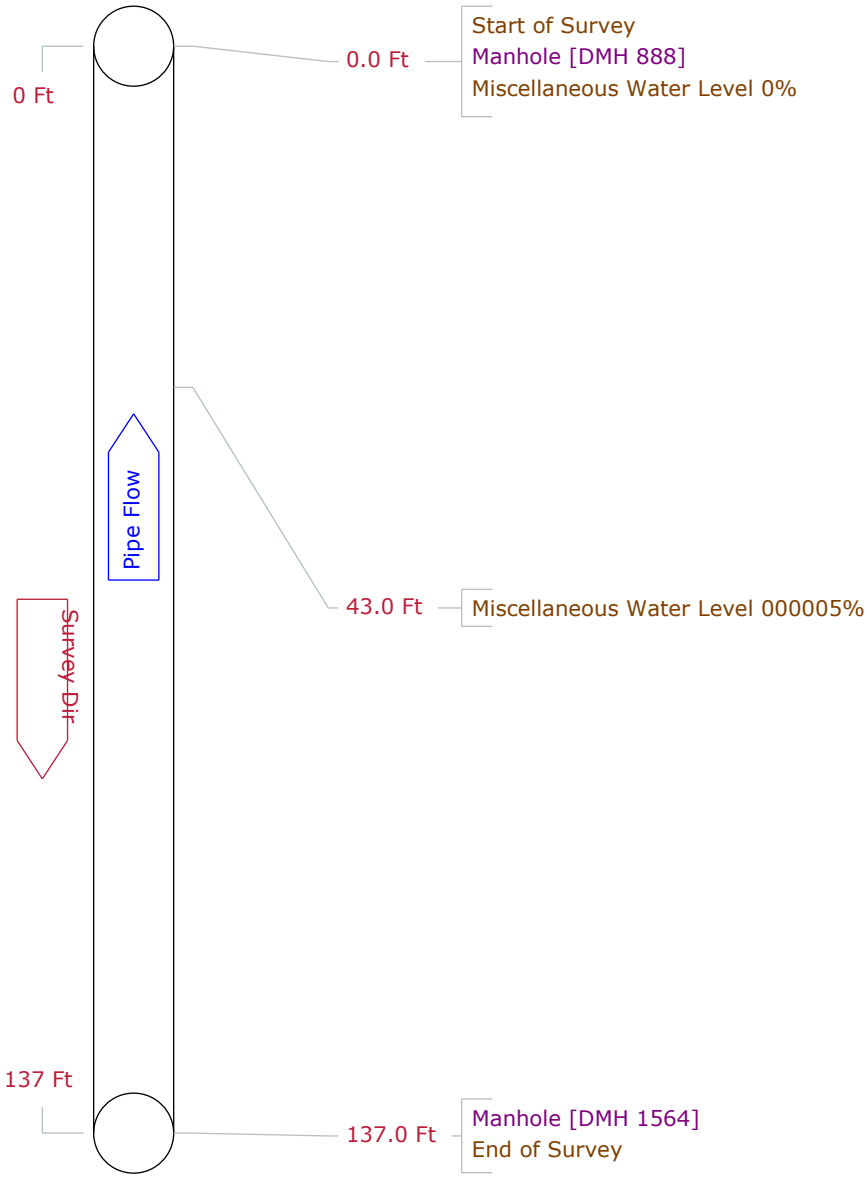
Pipe Graphic Report of PLR DMH 1564 X for Woodard and Curran

Setup 20	**Surveyed By** ZC	**Certificate #** 614-06021733	**Owner**		
Reviewed By	**Reviewer #**	**Work Order**			
Customer		**P/O #**			
Media Label	**Project** Agawam Storm Drain CCTV Investigation				
Date 2021/01/06	**Time** 13:52	**Weather**	**Pre-Cleaning** N	**Date Cleaned**	
Flow control	**Survey Purpose**			**Direction** Upstream	
Street Springfield St		**City** Agawam		**Drainage area**	
Location Code			**Pipe Use** Stormwater Pipe		
Location details			**Height** 42	**Width** ins	
Shape Circular	**Material** Reinforced Concrete Pipe		**Lining**		
Coating	**Pipe Joint length** Ft	**Total length** 137.0 Ft	Structural	O & M	
Length Surveyed 137.00 Ft	**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional	

Up DMH 1564	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 888	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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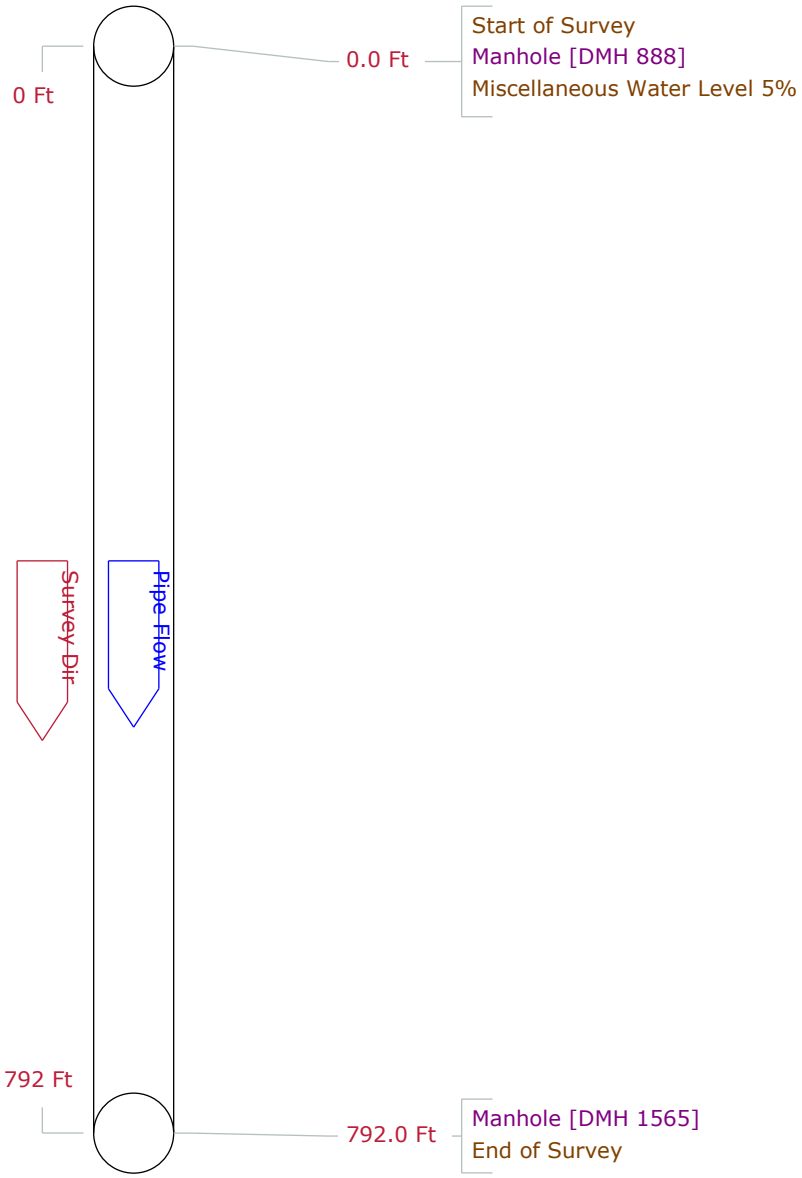
Pipe Graphic Report of PLR DMH 888 X for Woodard and Curran

Setup	16	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/06	**Time**	8:12	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Springfield St	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	42
Width	**ins**				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	792.0 **Ft**
Length Surveyed	792.00 **Ft**	**Year Constructed**		**Year Renewed**	

Structural	O & M
Miscellaneous	Constructional

Up	DMH 888	**Rim to invert**		**Grade to invert**	**Rim to grade** **Ft**
Down	DMH 1565	**Rim to invert**		**Grade to invert**	**Rim to grade** **Ft**



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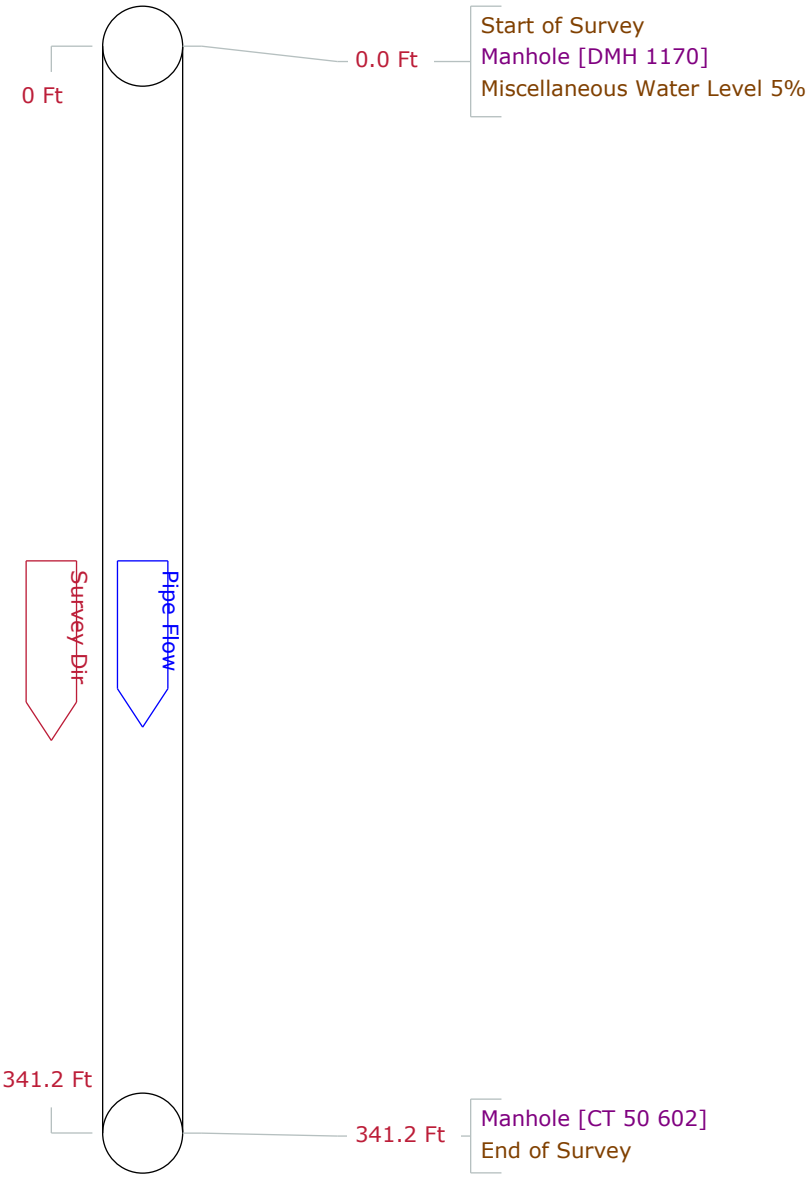
Pipe Graphic Report of PLR DMH 1170 X for Woodard and Curran

Setup	82	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/19	**Time**	11:34	**Weather**	
Pre-Cleaning	N	**Date Cleaned**		**Flow control**	
Survey Purpose		**Direction**	Downstream		
Street	Dartmouth St.	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	42	**Width**	**ins**
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	341.2 **Ft**
Length Surveyed	341.20 **Ft**	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 1170	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	CT 50 602	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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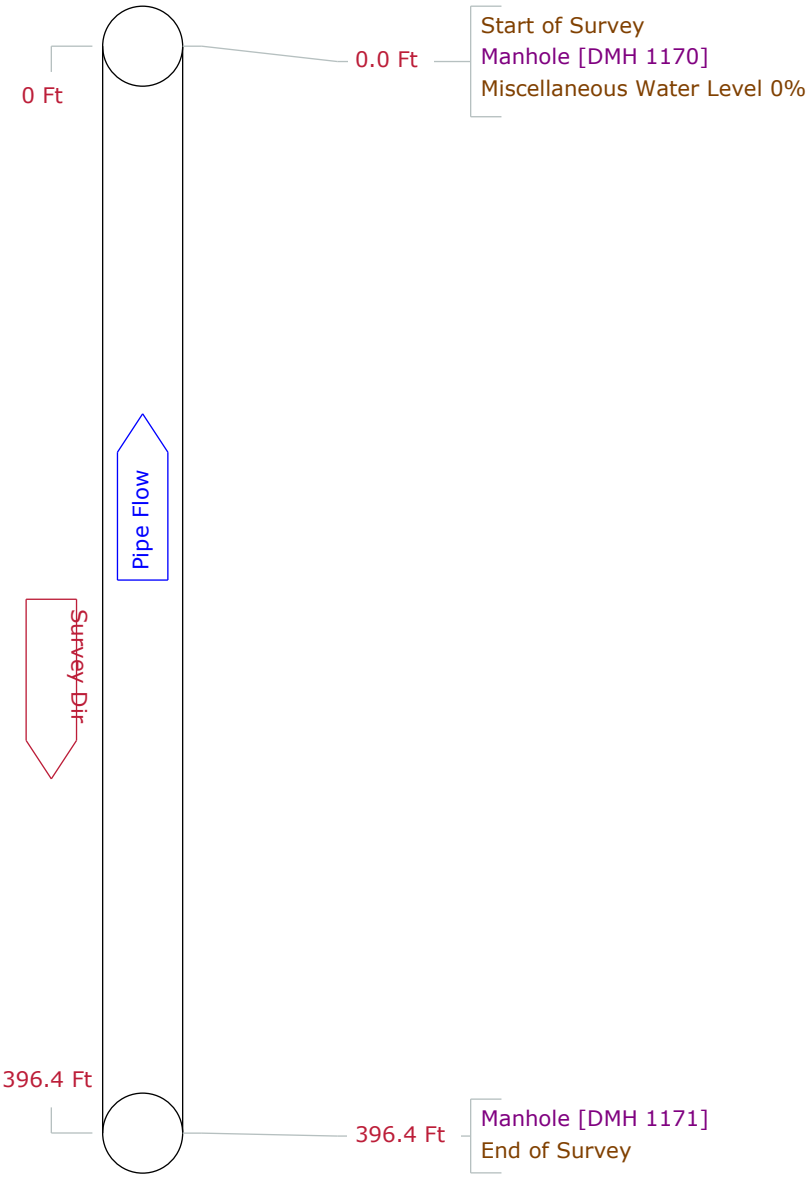
Pipe Graphic Report of PLR DMH 1171 X for Woodard and Curran

Setup	83	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/19	**Time**	12:05	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	Dartmouth St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	42
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	396.4 Ft
Length Surveyed	396.40 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 1171	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 1170	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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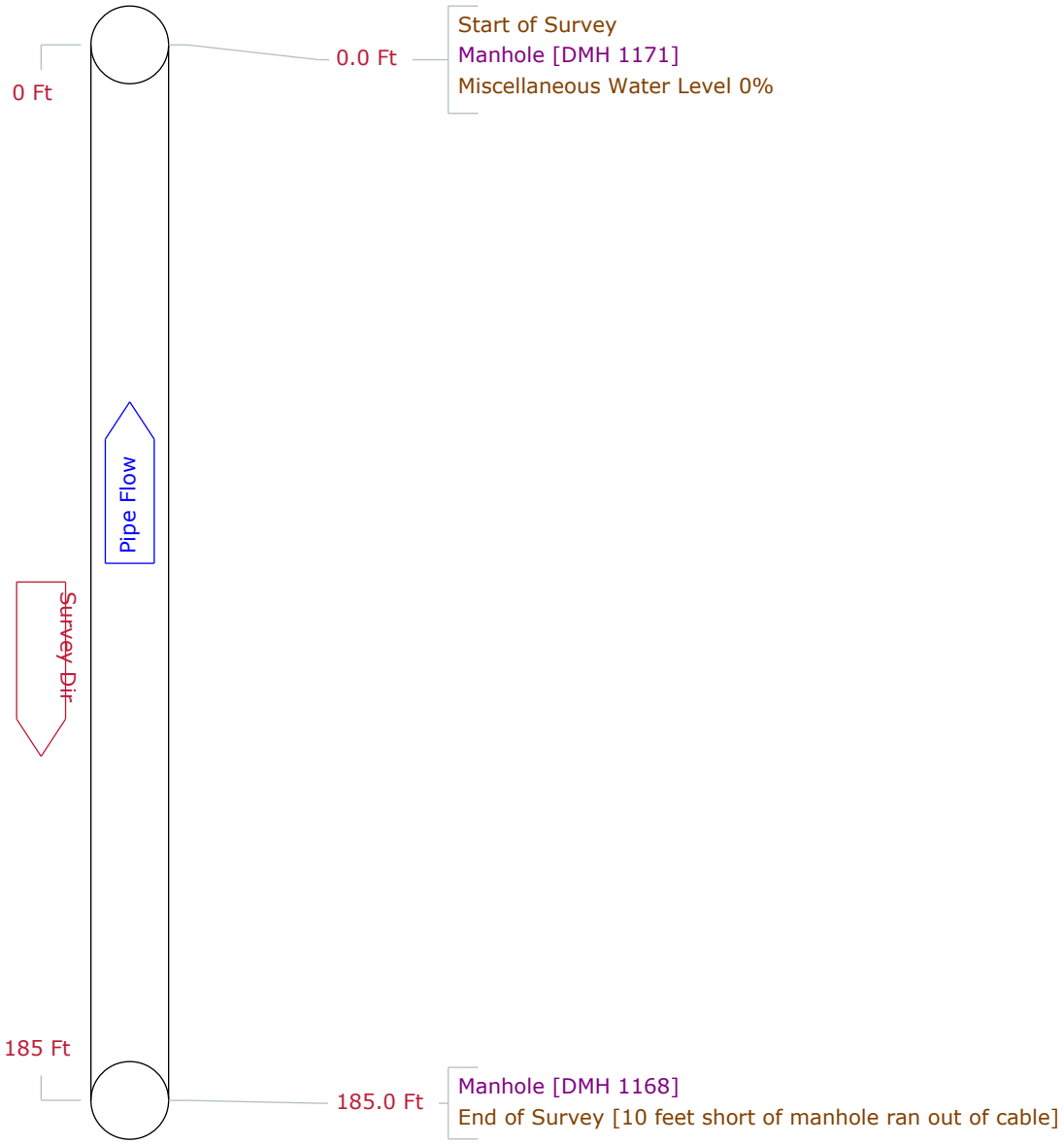
Pipe Graphic Report of PLR DMH 1168 X for Woodard and Curran

Setup	84	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/19	**Time**	12:15	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	Dartmouth St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	42
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	185.0 Ft
Length Surveyed	185.00 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 1168	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 1171	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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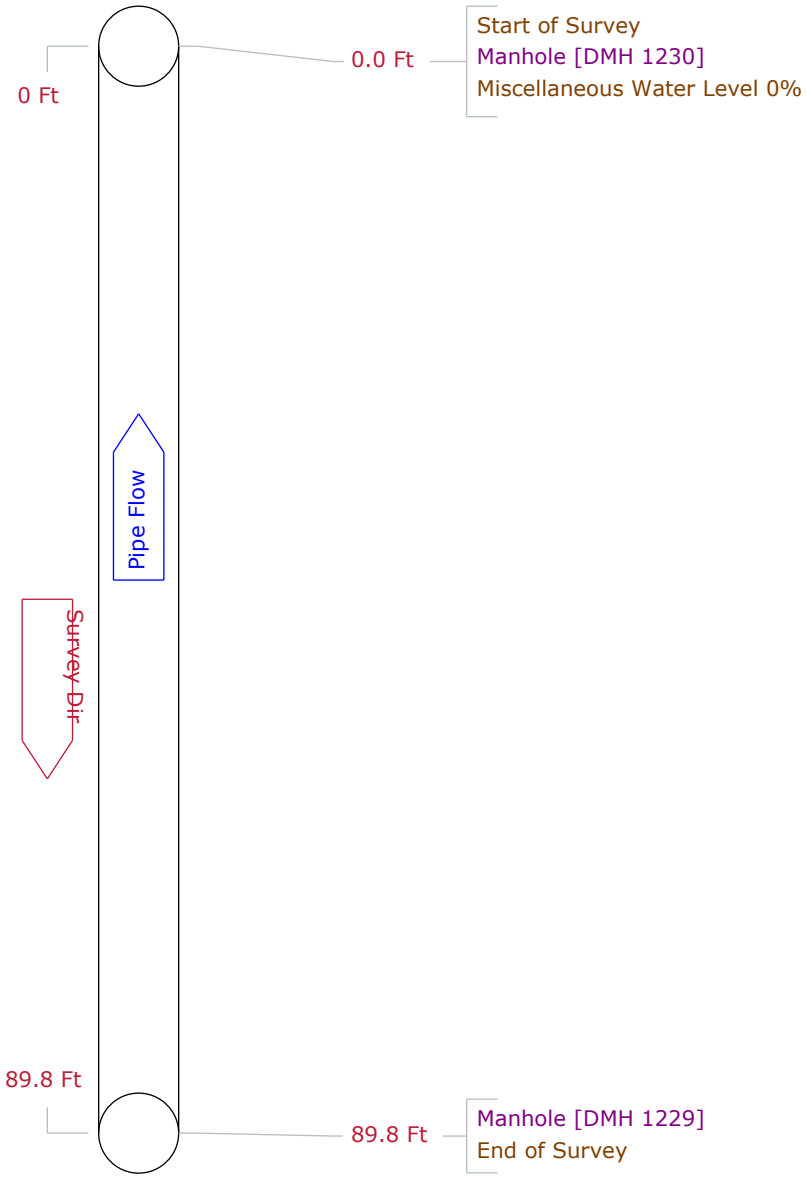
Pipe Graphic Report of PLR DMH 1229 X for Woodard and Curran

Setup 19	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/06	**Time** 12:09	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Upstream
Street Springfield St			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 42	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 89.8 Ft	Structural	O & M
Length Surveyed 89.80 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 1229	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 1230	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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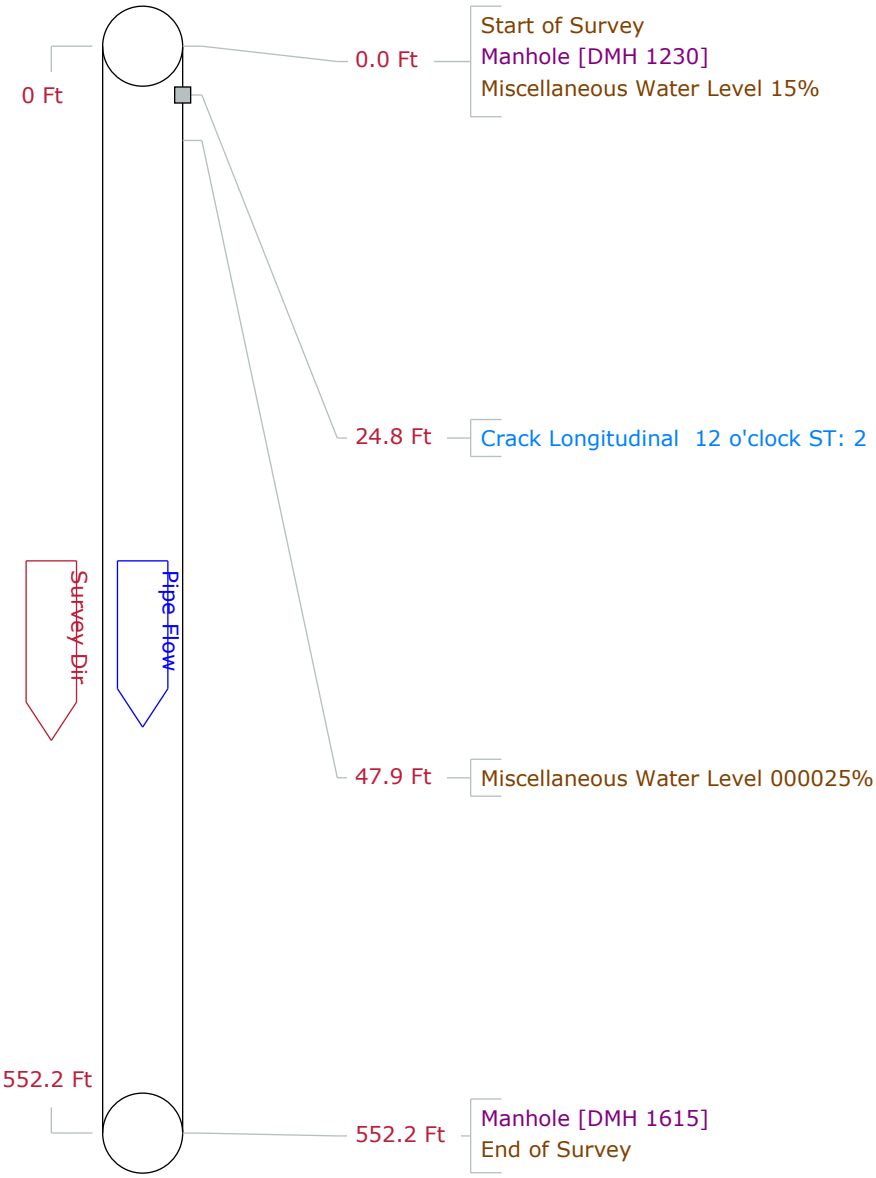
Pipe Graphic Report of PLR DMH 1230 X for Woodard and Curran

Setup 17	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/06	**Time** 11:03	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Springfield St			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 42	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 552.2 Ft	Structural	O & M
Length Surveyed 552.20 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 1230	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 1615	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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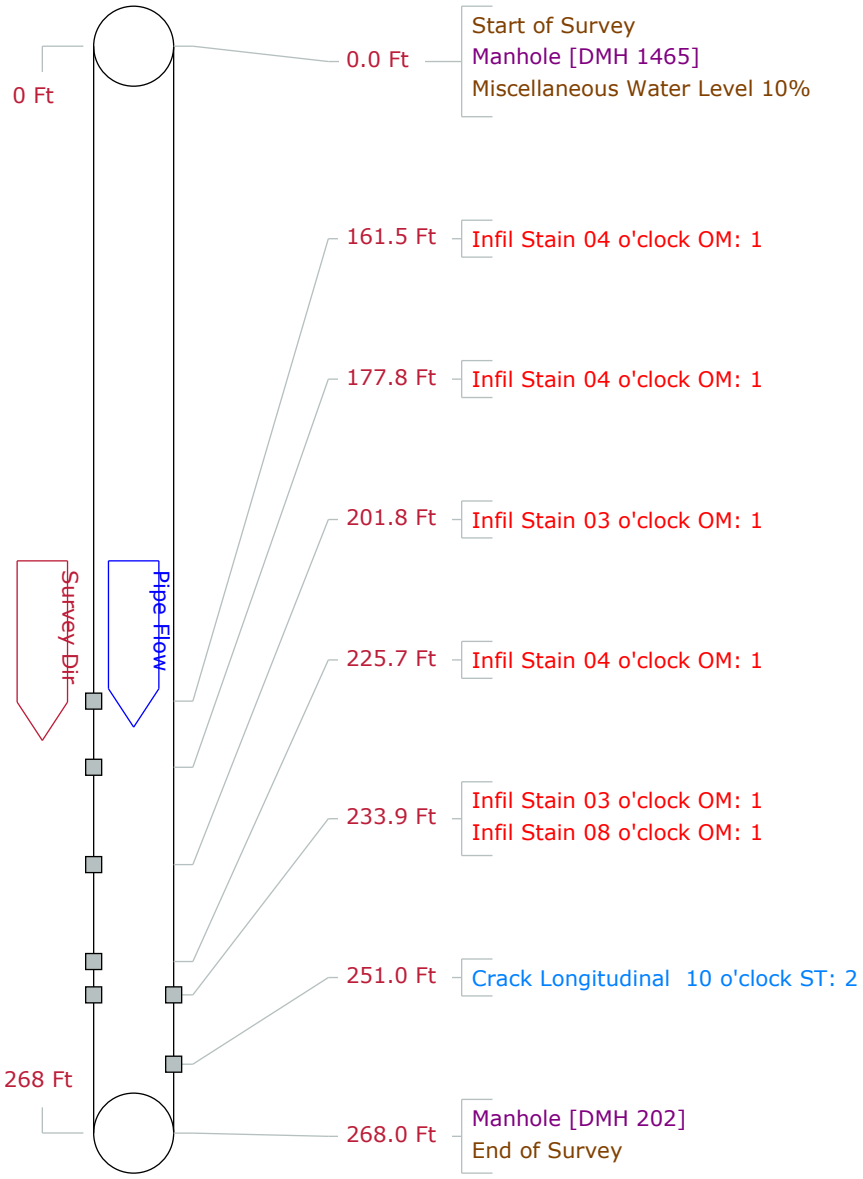
Pipe Graphic Report of PLR DMH 1465 X for Woodard and Curran

Setup 77	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/19	**Time** 8:36	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Independence Rd.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 20	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 268.0 Ft	Structural	O & M
Length Surveyed 268.00 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 1465	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 202	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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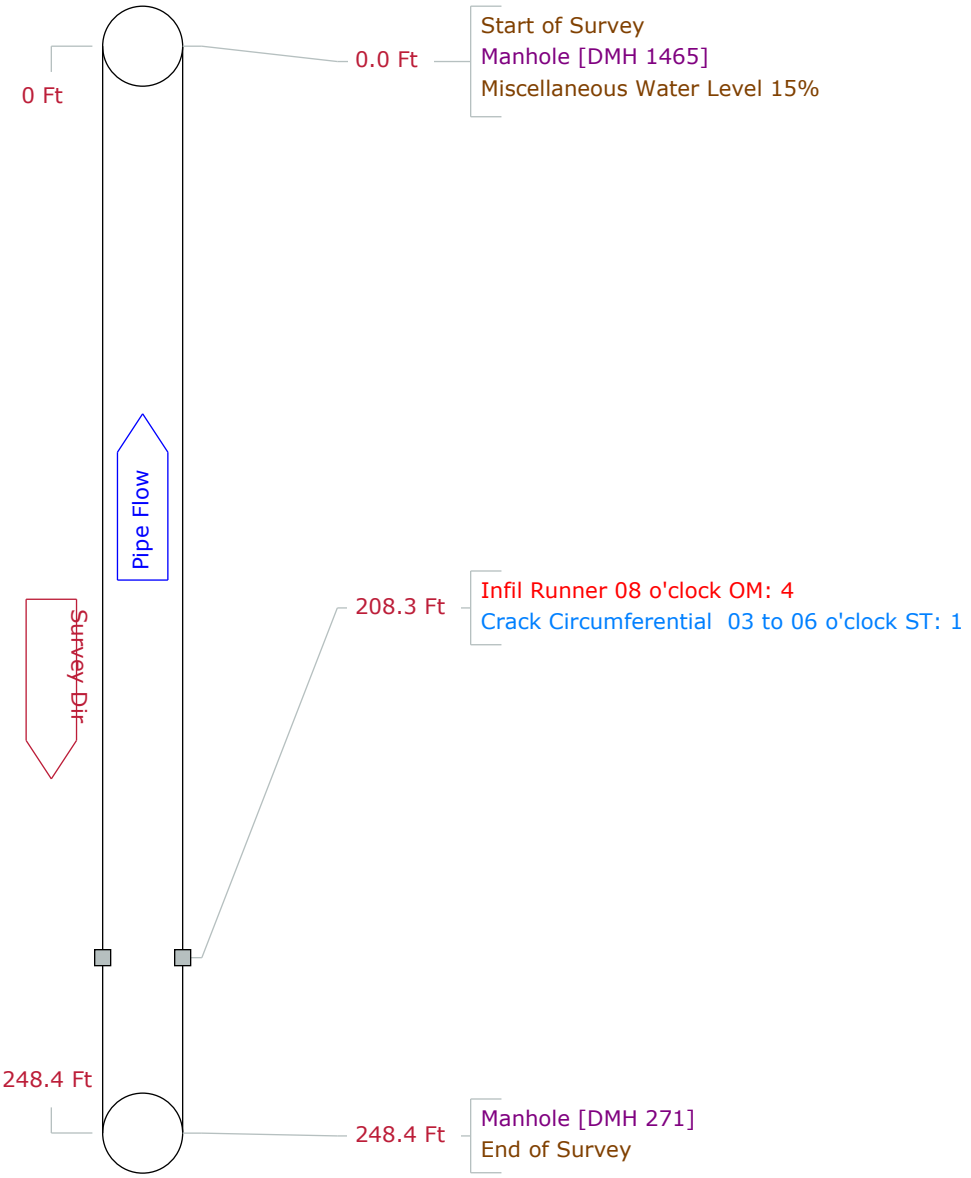
Pipe Graphic Report of PLR DMH 271 X for Woodard and Curran

Setup	76	**Surveyed By**	ZC	**Certificate #**	614-06021733	**Owner**	
Reviewed By		**Reviewer #**		**Work Order**			
Customer				**P/O #**			
Media Label		**Project**	Agawam Storm Drain CCTV Investigation				
Date	2021/01/19	**Time**	7:58	**Weather**		**Pre-Cleaning**	N
Date Cleaned							
Flow control		**Survey Purpose**				**Direction**	Upstream
Street	Independence Rd.	**City**	Agawam	**Drainage area**			
Location Code				**Pipe Use**	Stormwater Pipe		
Location details				**Height**	18	**Width**	ins
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**			
Coating		**Pipe Joint length**	Ft	**Total length**	248.4 Ft	Structural	O & M
Length Surveyed	248.40 Ft	**Year Constructed**		**Year Renewed**		Miscellaneous	Constructional

Up	DMH 271	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 1465	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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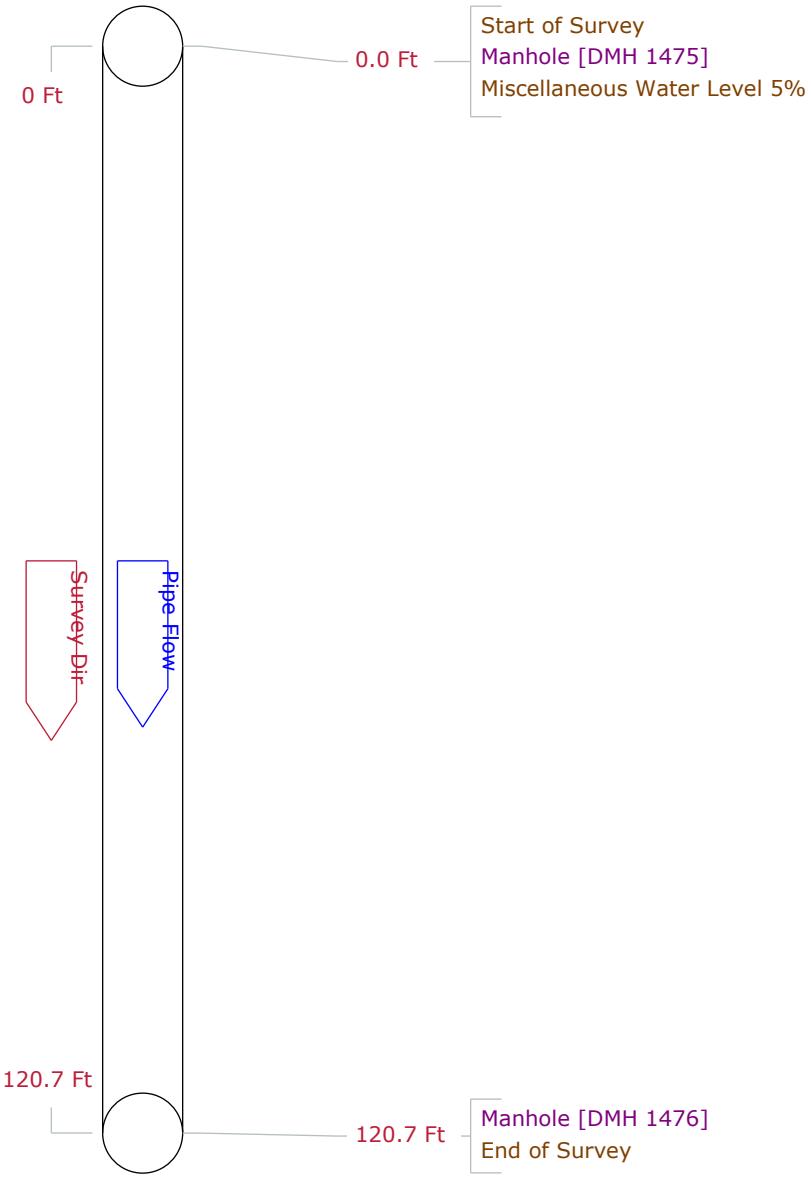
Pipe Graphic Report of PLR DMH 1475 X for Woodard and Curran

Setup	33	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/08	**Time**	10:36	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Walnut St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	24
Width		**ins**			
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	120.7 **Ft**
Length Surveyed	120.70 **Ft**	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 1475	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 1476	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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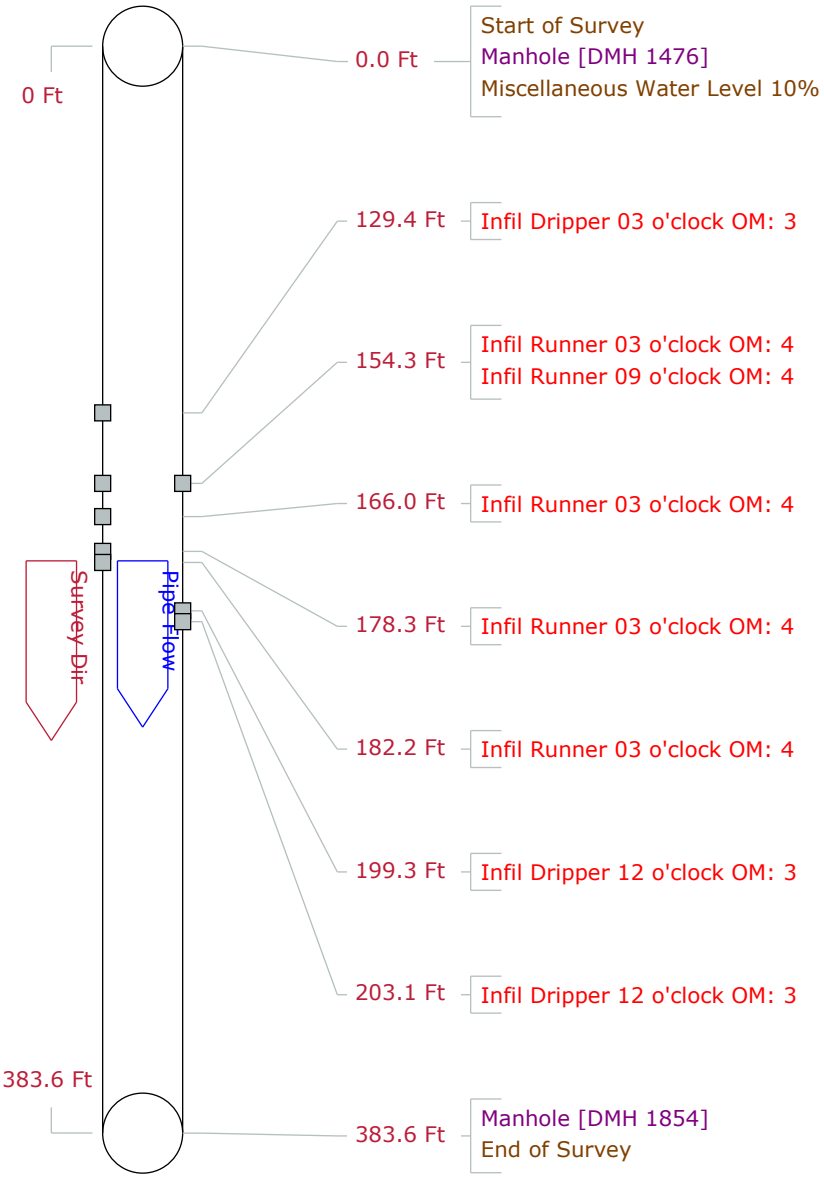
Pipe Graphic Report of PLR DMH 1476 X for Woodard and Curran

Setup 34	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/08	**Time** 10:43	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Walnut St.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height** 24	**Width** ins
Shape Circular		**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft** **Total length** 383.6 **Ft**	Structural	O & M
Length Surveyed	383.60 **Ft**	**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up	DMH 1476	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 1855	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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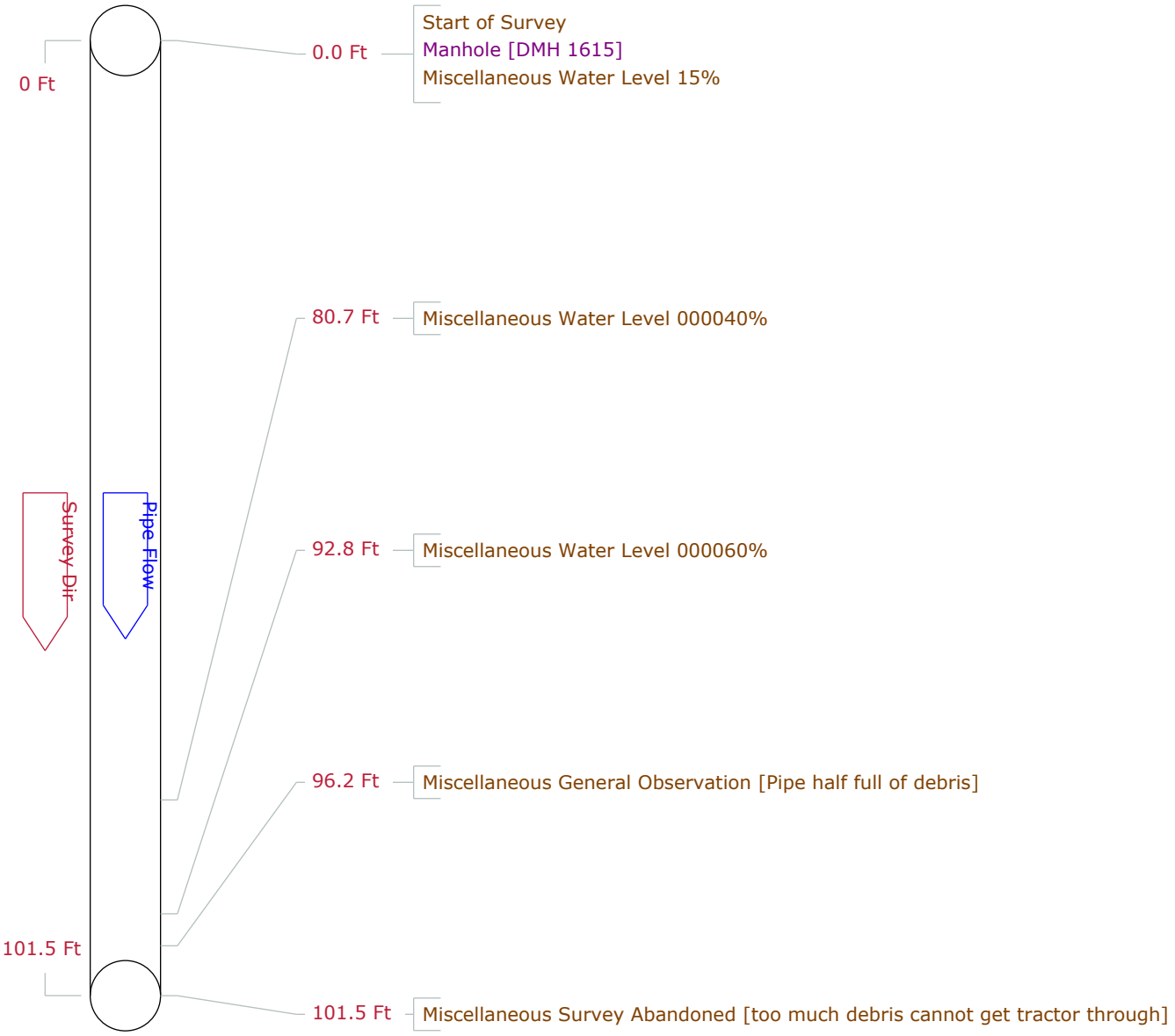
Pipe Graphic Report of PLR DMH 1615 X for Woodard and Curran

Setup	18	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/06	**Time**	11:30	**Weather**	
Pre-Cleaning	N	**Date Cleaned**		**Flow control**	
Survey Purpose		**Direction**	Downstream		
Street	Springfield St	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	42	**Width**	**ins**
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	**Ft**
Length Surveyed	101.50 **Ft**	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 1615	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	CB 1465	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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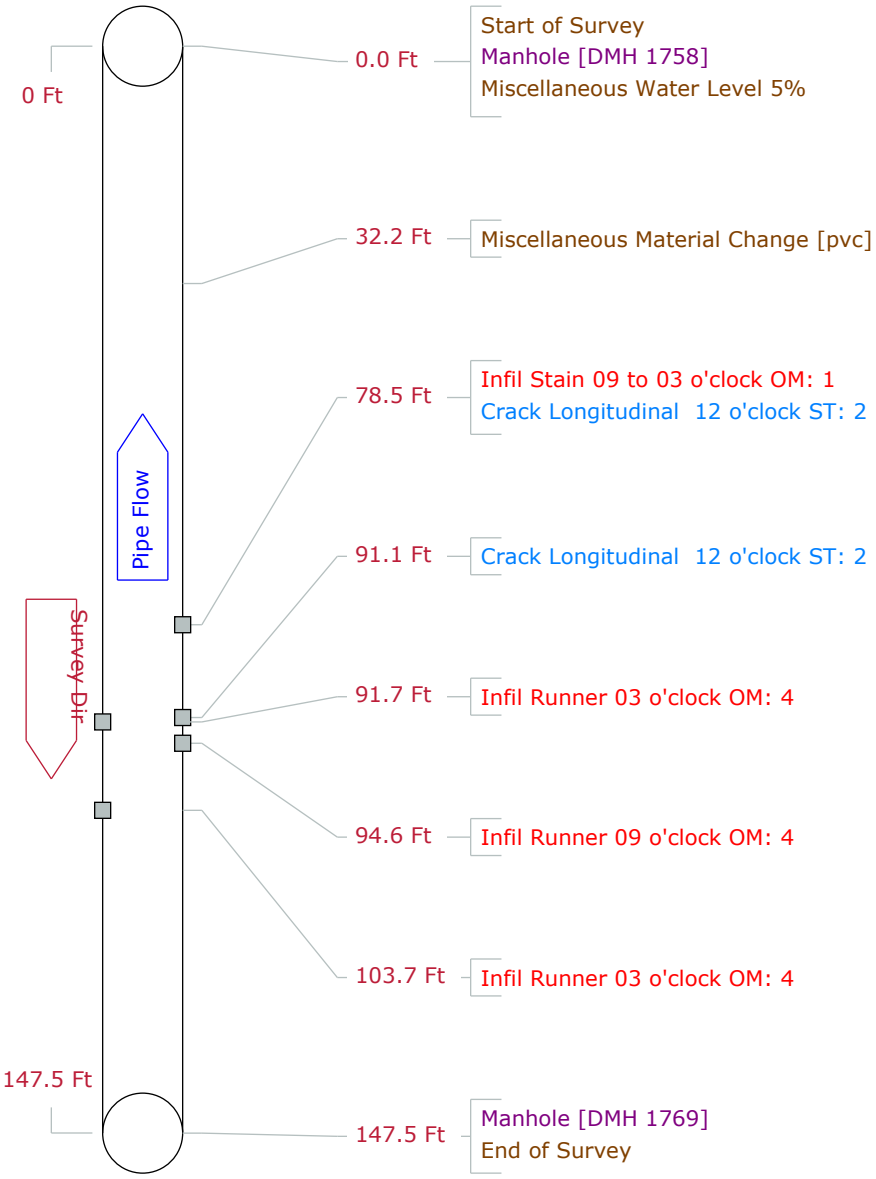
Pipe Graphic Report of PLR DMH 1769 X for Woodard and Curran

Setup 31	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/08	**Time** 8:39	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Upstream
Street Bridge St			**City** Agawam		**Drainage area**
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height** 18	**Width** ins
Shape Circular		**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft** **Total length** 147.5 **Ft**	Structural	O & M
Length Surveyed	147.50 **Ft**	**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up	DMH 1769	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 1758	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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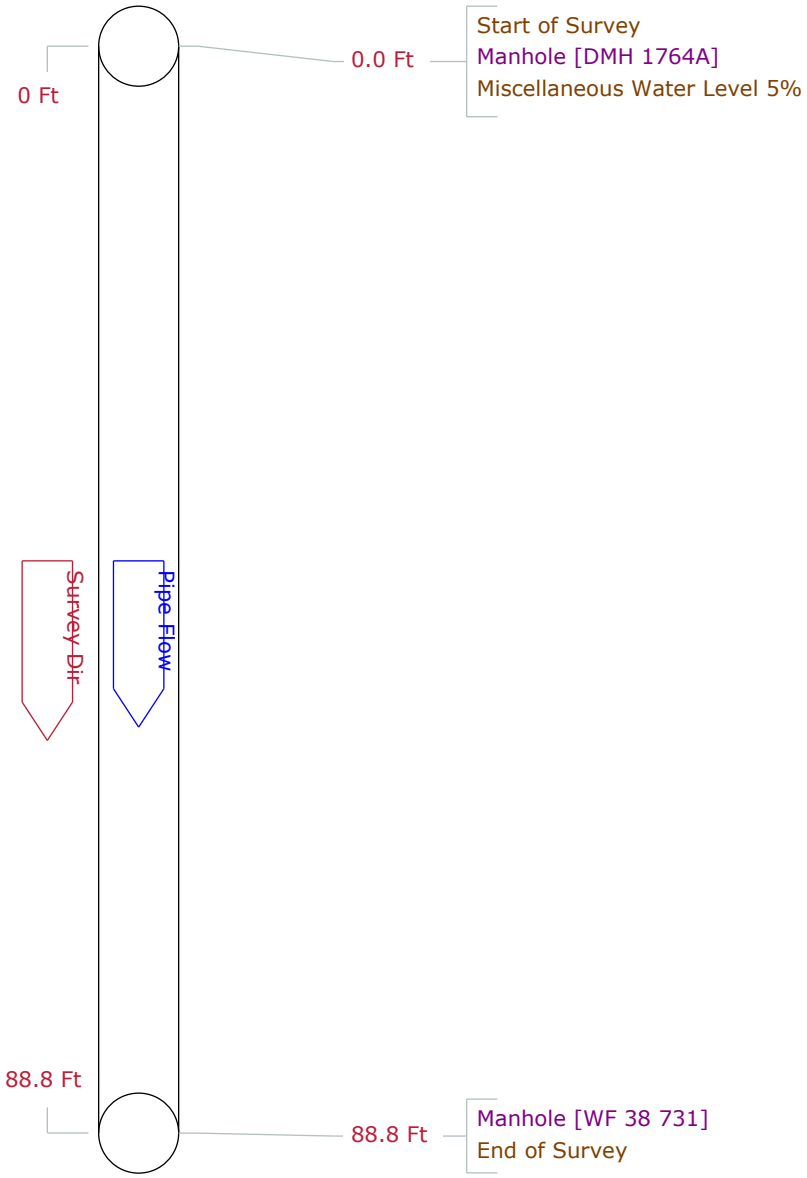
Pipe Graphic Report of PLR DMH 1764A X for Woodard and Curran

Setup	29	**Surveyed By**	ZC	**Certificate #**	614-06021733	**Owner**	
Reviewed By		**Reviewer #**		**Work Order**			
Customer				**P/O #**			
Media Label		**Project**	Agawam Storm Drain CCTV Investigation				
Date	2021/01/07	**Time**	13:50	**Weather**		**Pre-Cleaning**	N
Date Cleaned							
Flow control		**Survey Purpose**				**Direction**	Downstream
Street	Bridge St			**City**	Agawam	**Drainage area**	
Location Code						**Pipe Use**	Stormwater Pipe
Location details						**Height**	18
Width	ins						
Shape	Circular			**Material**	Reinforced Concrete Pipe	**Lining**	
Coating				**Pipe Joint length**	Ft	**Total length**	88.8 Ft
Length Surveyed	88.80 Ft	**Year Constructed**		**Year Renewed**			

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 1764A	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	WF 38 731	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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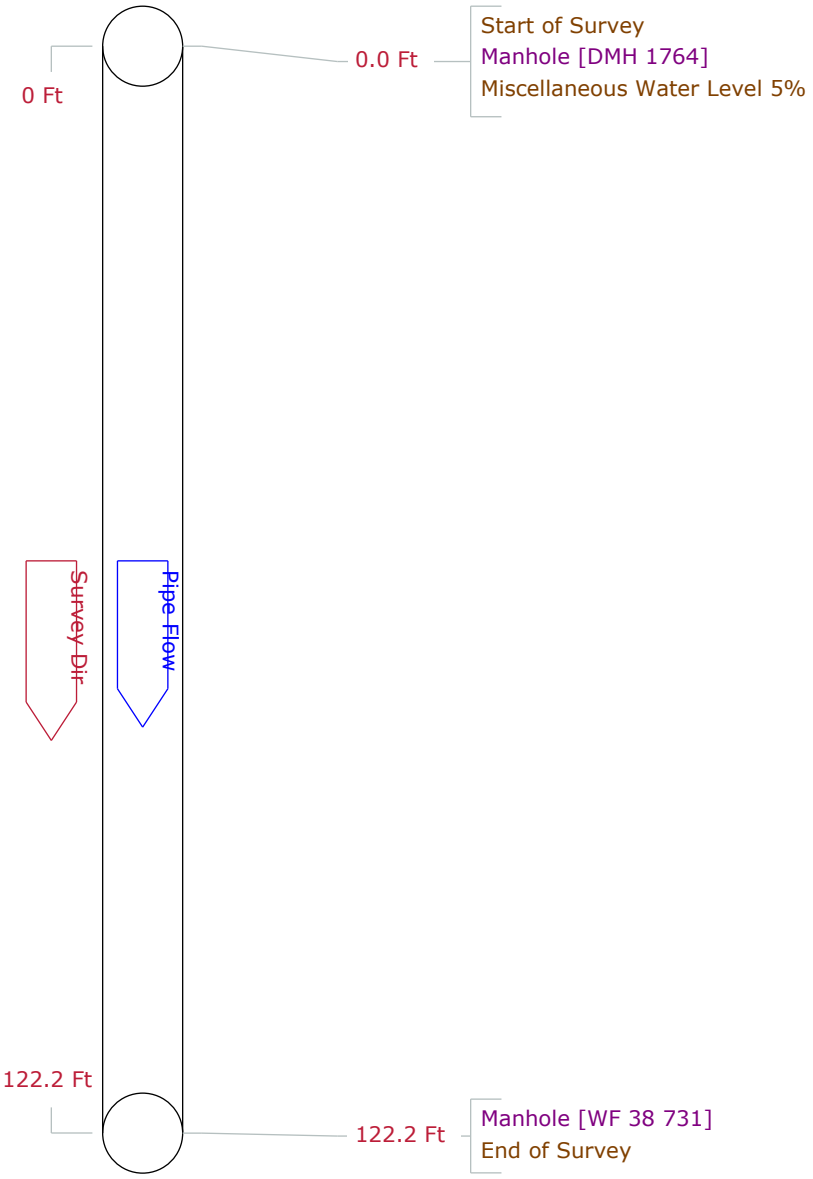
Pipe Graphic Report of PLR DMH 1764 X for Woodard and Curran

Setup	28	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/07	**Time**	13:37	**Weather**	
Pre-Cleaning	N	**Date Cleaned**		**Flow control**	
Survey Purpose		**Direction**	Downstream		
Street	Bridge St	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	18	**Width**	**ins**
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	122.2 **Ft**
Length Surveyed	122.20 **Ft**	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 1764	**Rim to invert**		**Grade to invert**	**Rim to grade** **Ft**
Down	DMH 1764A	**Rim to invert**		**Grade to invert**	**Rim to grade** **Ft**



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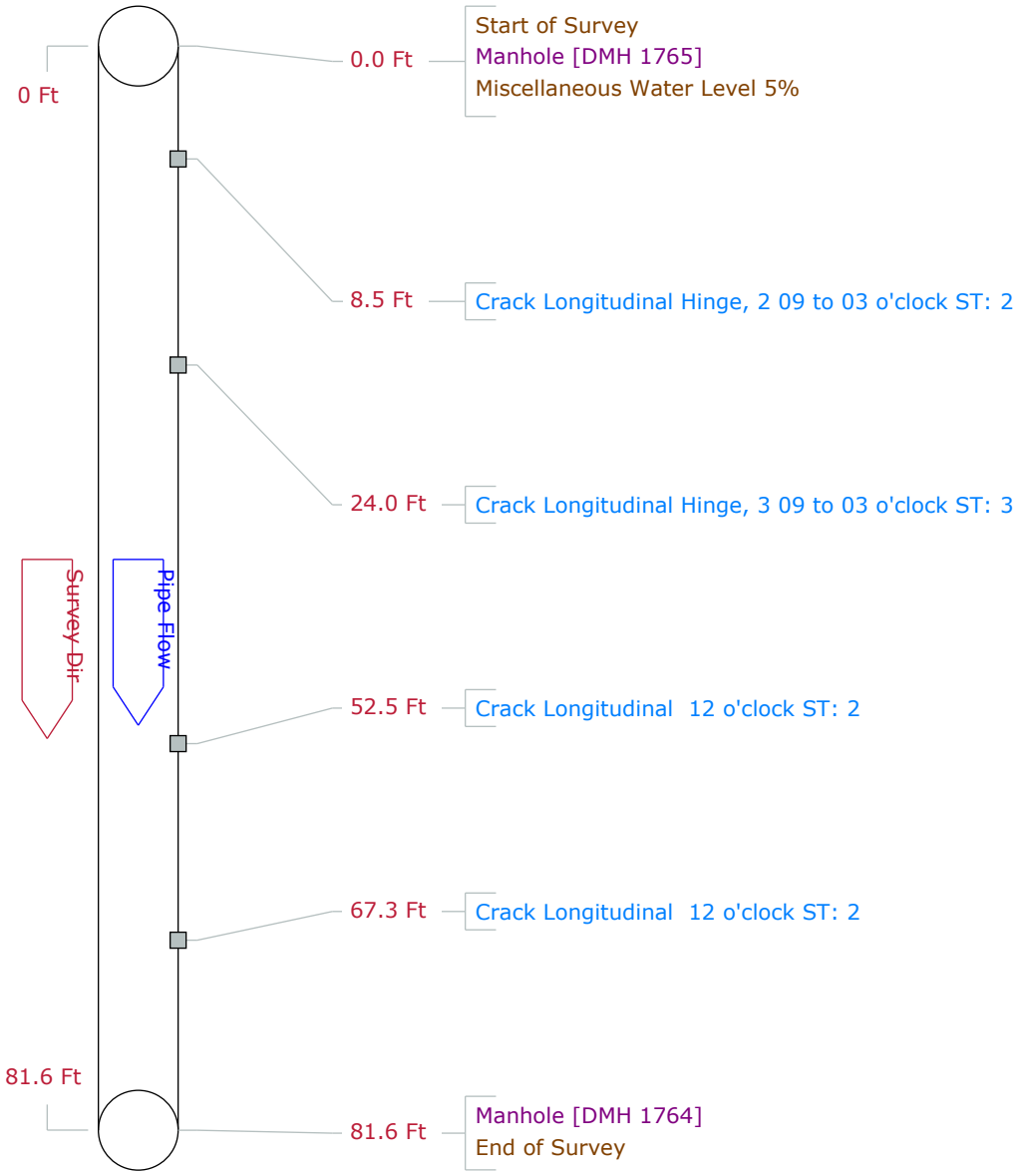
Pipe Graphic Report of PLR DMH 1765 X for Woodard and Curran

Setup 27	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/07	**Time** 13:30	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Bridge St			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 18	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 81.6 Ft	Structural	O & M
Length Surveyed 81.60 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 1765	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 1764	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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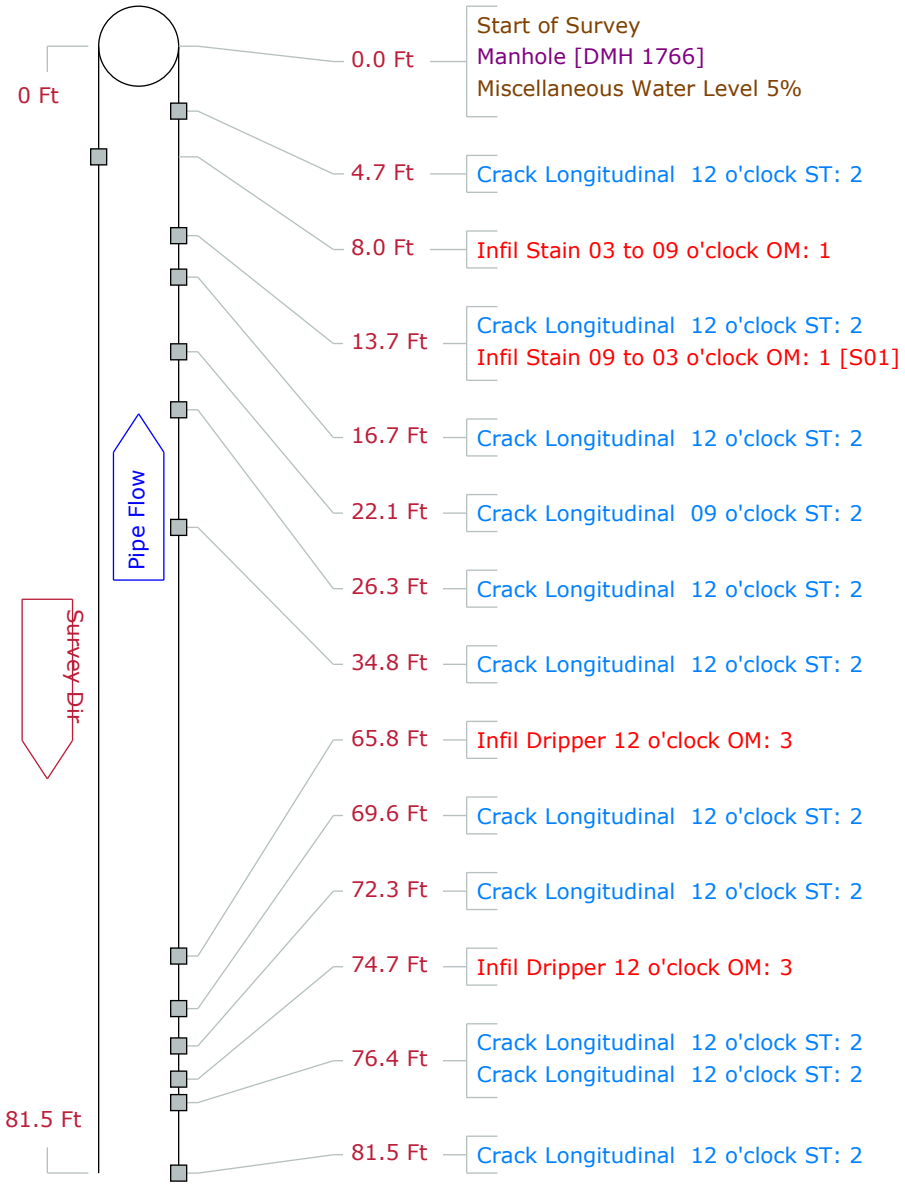
Pipe Graphic Report of PLR DMH 1758 X for Woodard and Curran

Setup 30	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/08	**Time** 8:11	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Upstream
Street Bridge St			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 18	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 459.7 Ft	Structural	O & M
Length Surveyed	459.70 Ft	**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up	DMH 1758	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 1766	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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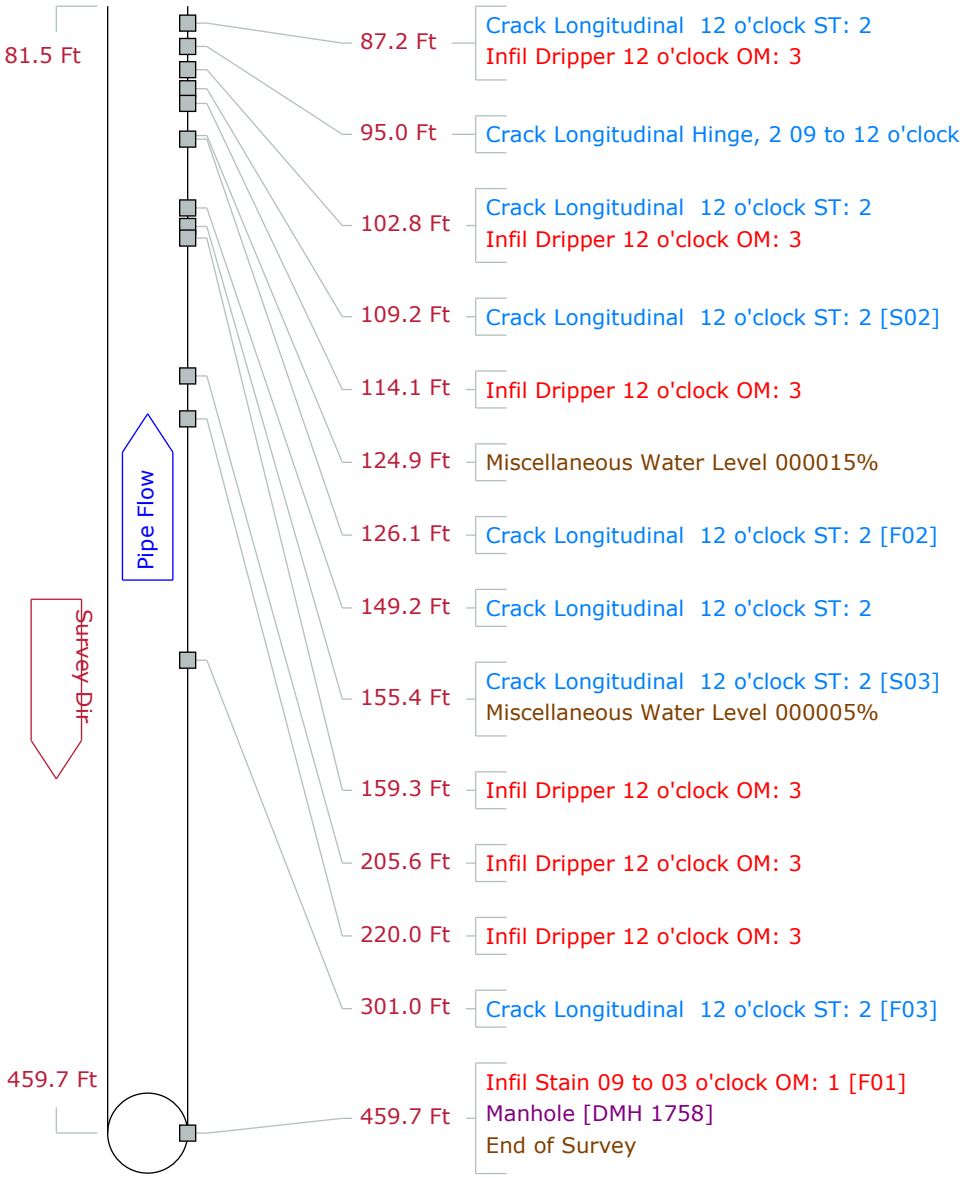
Pipe Graphic Report of PLR DMH 1758 X for Woodard and Curran

Setup 30	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/08	**Time** 8:11	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Upstream
Street Bridge St			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 18	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 459.7 Ft	Structural	O & M
Length Surveyed	459.70 Ft	**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up	DMH 1758	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 1766	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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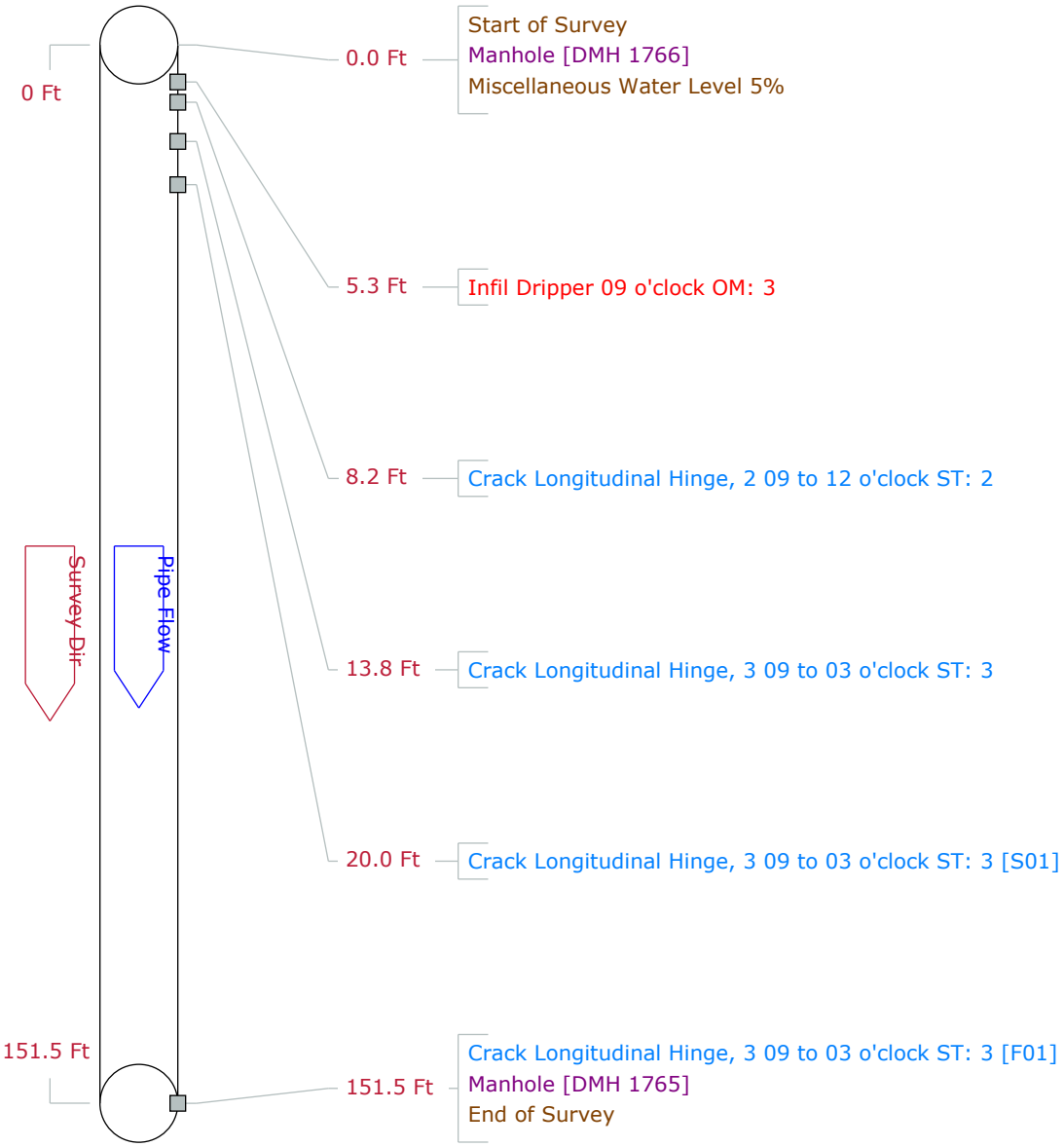
Pipe Graphic Report of PLR DMH 1766 X for Woodard and Curran

Setup	26	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/07	**Time**	13:24	**Weather**	
Pre-Cleaning	N	**Date Cleaned**		**Flow control**	
Survey Purpose		**Direction**	Downstream		
Street	Bridge St	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	18	**Width**	ins
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	151.5 Ft
Length Surveyed	151.50 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M
Miscellaneous	Constructional

Up	DMH 1766	**Rim to invert**		**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 1765	**Rim to invert**		**Grade to invert**	**Rim to grade**	**Ft**



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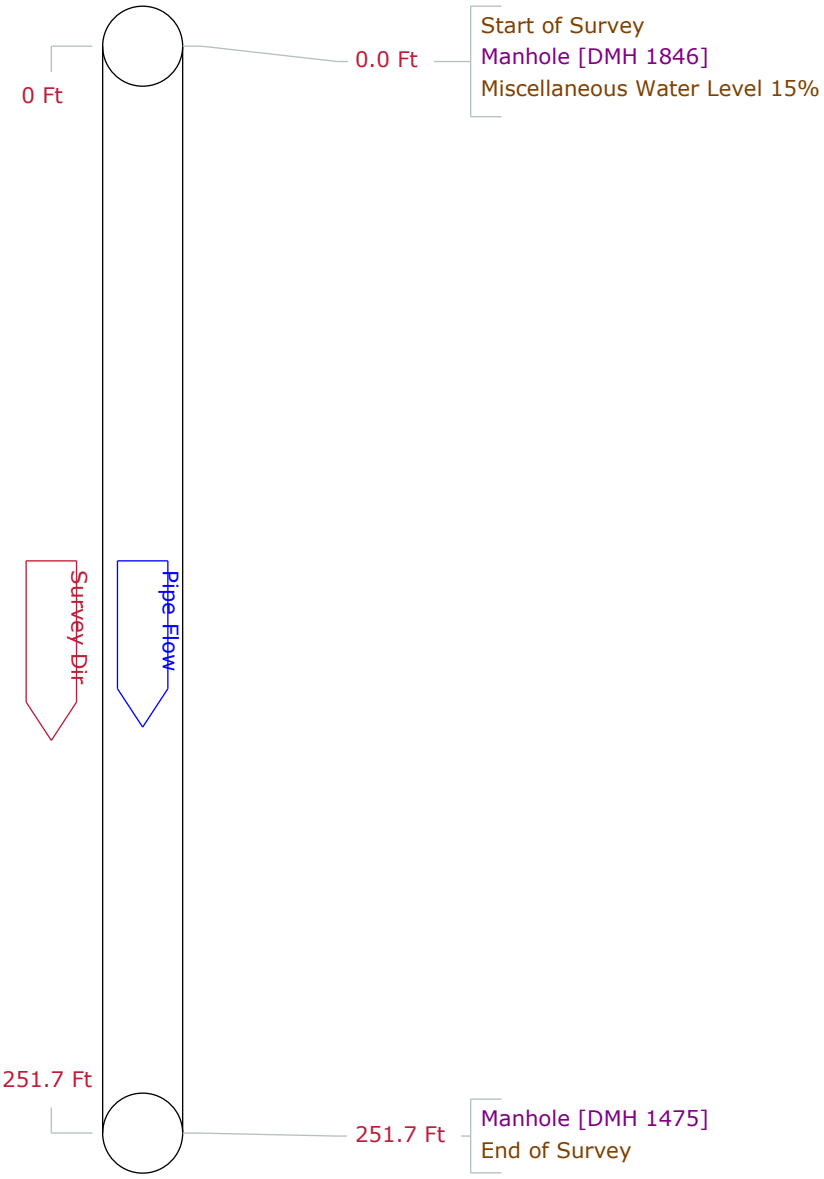
Pipe Graphic Report of PLR DMH 1846 X for Woodard and Curran

Setup 32	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/08	**Time** 10:26	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Walnut St.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 24	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 251.7 Ft	Structural	O & M
Length Surveyed 251.70 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 1846	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 1475	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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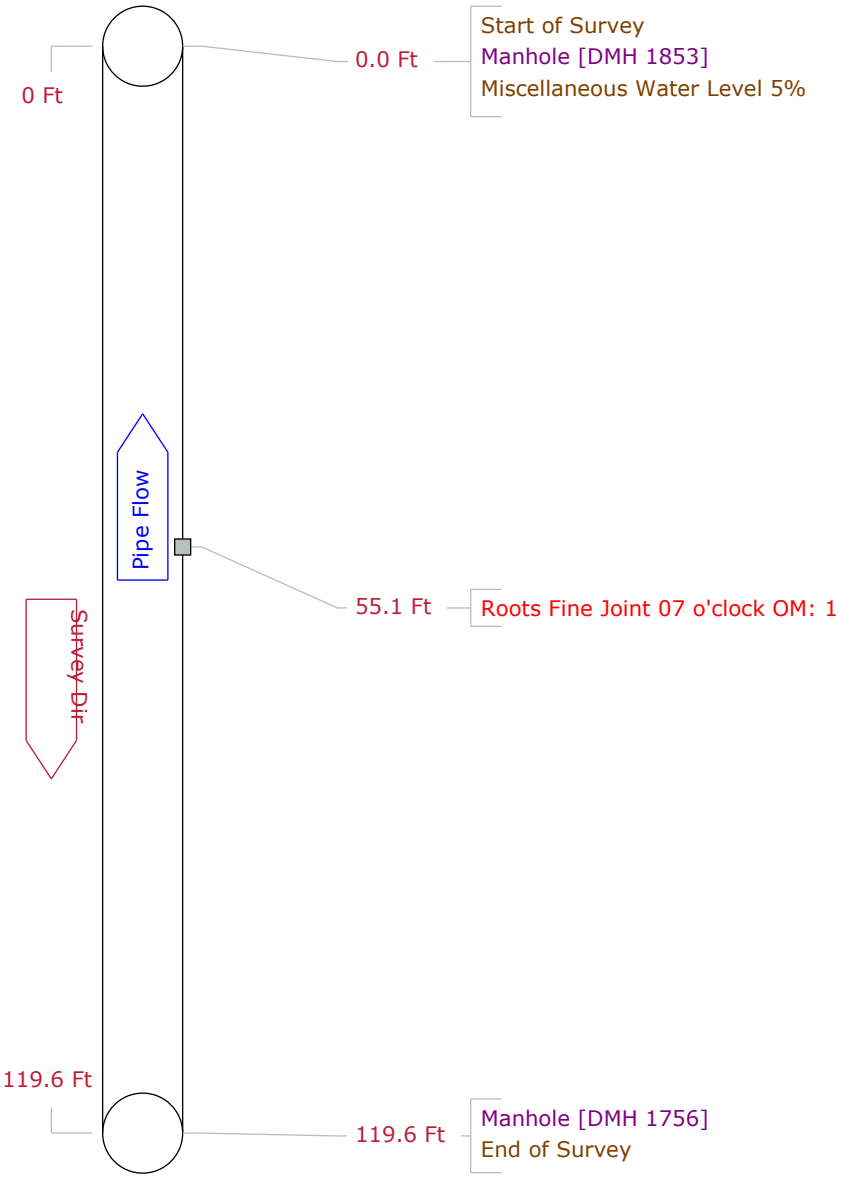
Pipe Graphic Report of PLR DMH 1756 X **for** **Woodard and Curran**

Setup	36	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/12	**Time**	7:51	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	Walnut St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	24
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	119.6 Ft
Length Surveyed	119.60 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 1756	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 1853	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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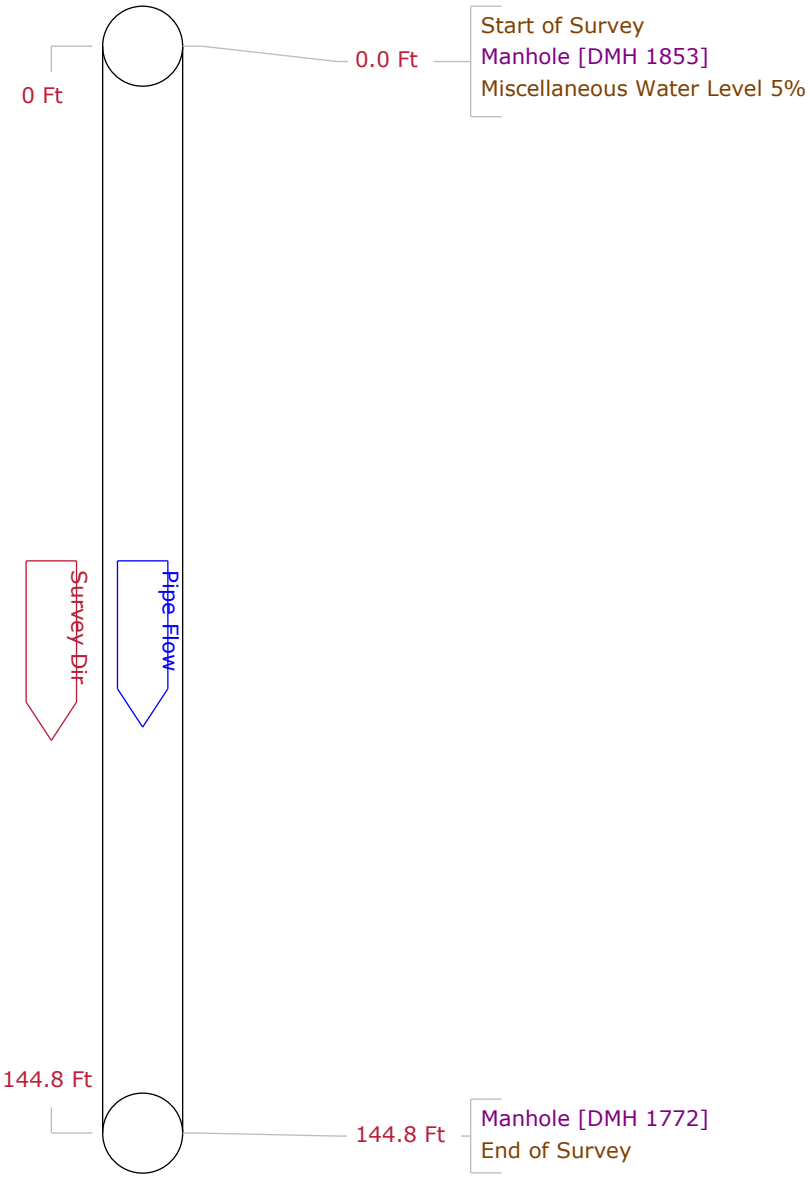
Pipe Graphic Report of PLR DMH 1853 X for Woodard and Curran

Setup 37	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/12	**Time** 8:04	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Walnut St.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 24	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 144.8 Ft	Structural	O & M
Length Surveyed 144.80 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional
Up DMH 1853		**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 1772		**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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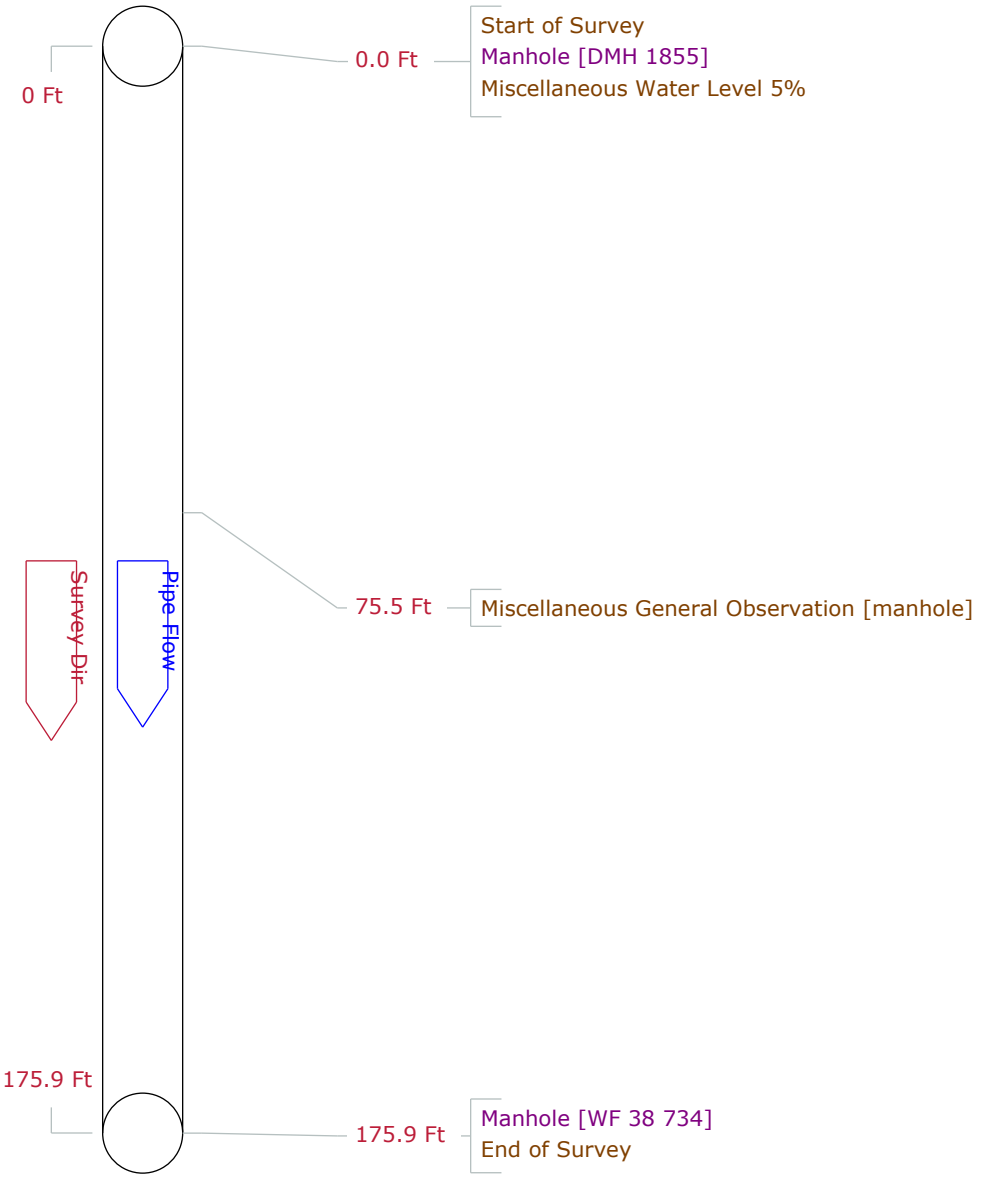
Pipe Graphic Report of PLR DMH 1855 X for Woodard and Curran

Setup 35	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/08	**Time** 11:01	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Walnut St.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 24	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 175.9 Ft	Structural	O & M
Length Surveyed	175.90 Ft	**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up	DMH 1855	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	WF 38 734	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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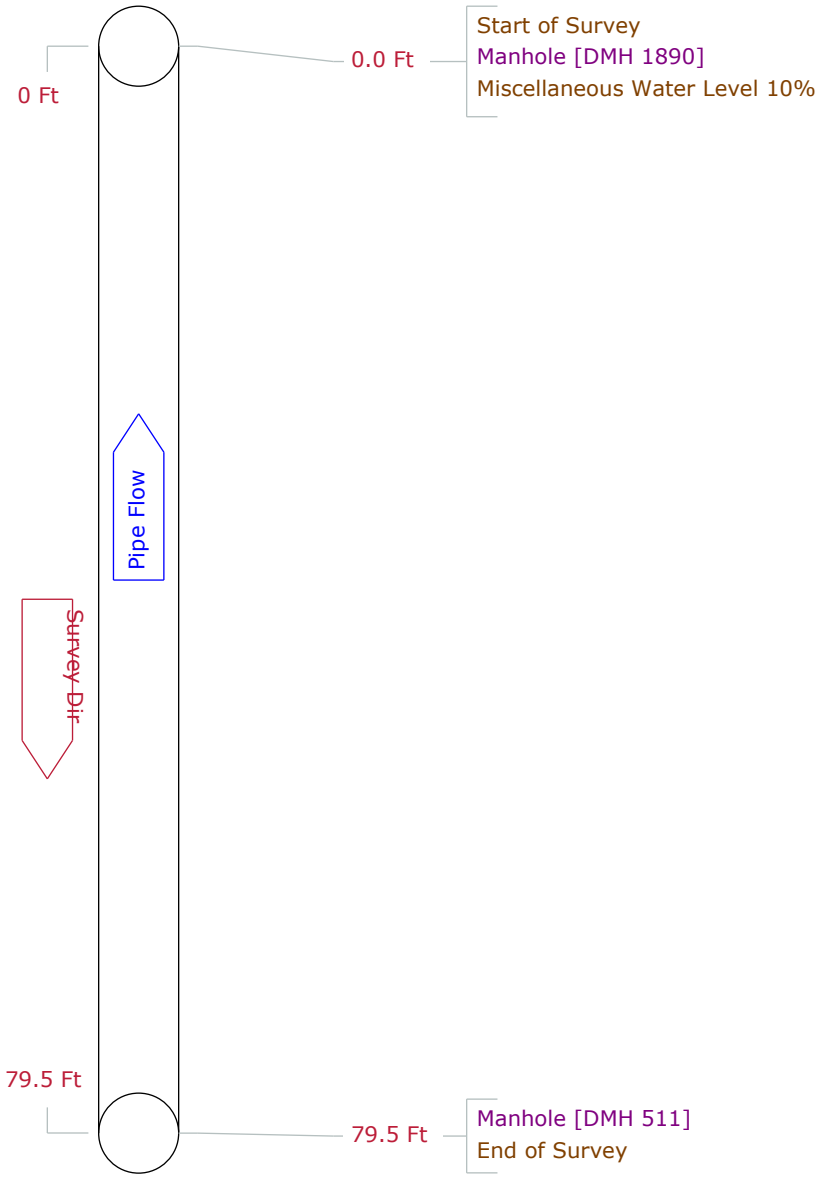
Pipe Graphic Report of PLR DMH 511 X for Woodard and Curran

Setup	56	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/13	**Time**	13:40	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	Springfield St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	18
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	79.5 Ft
Length Surveyed	79.50 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 511	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 1890	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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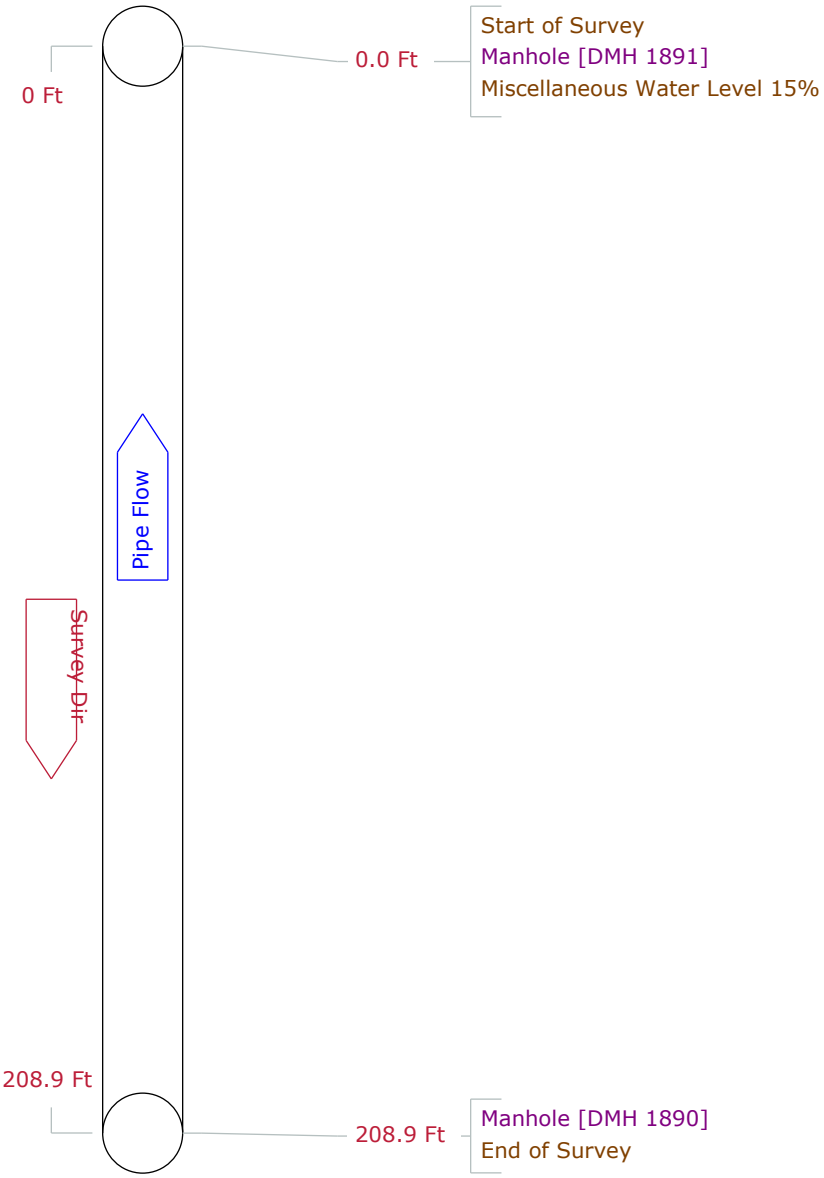
Pipe Graphic Report of PLR DMH 1890 X for Woodard and Curran

Setup	55	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/13	**Time**	13:35	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	Springfield St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	18
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	208.9 Ft
Length Surveyed	208.90 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 1890	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 1891	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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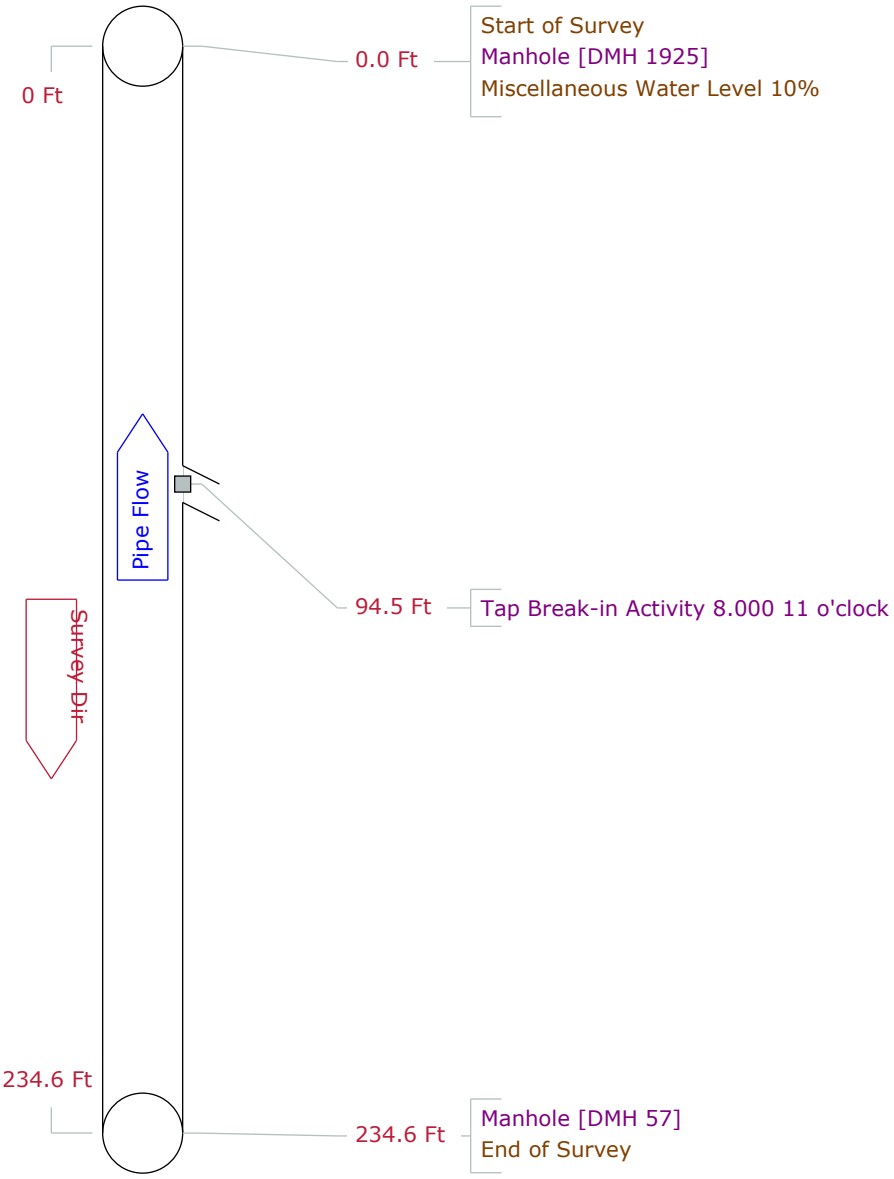
Pipe Graphic Report of PLR DMH 57 X for Woodard and Curran

Setup	44	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/12	**Time**	12:49	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	Springfield St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	18
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	234.6 Ft
Length Surveyed	234.60 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 57	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 1925	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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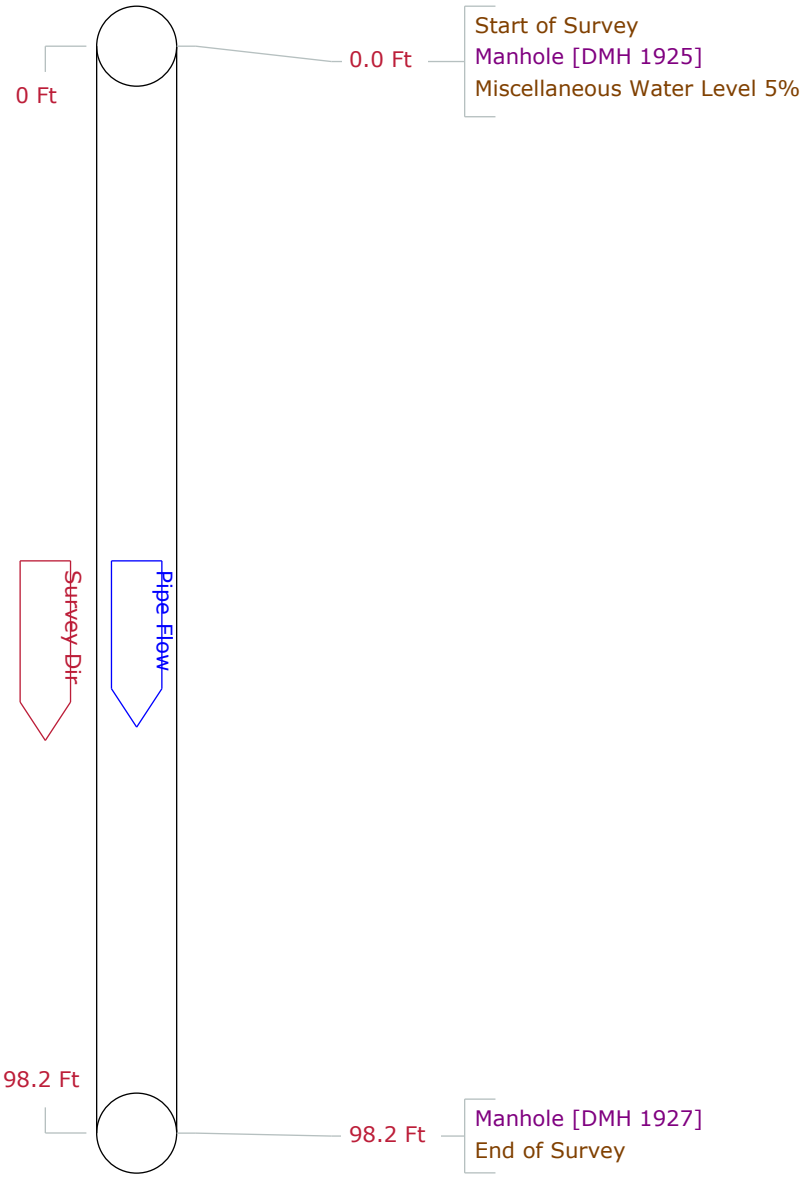
Pipe Graphic Report of PLR DMH 1925 X for Woodard and Curran

Setup	43	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/12	**Time**	12:33	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Springfield St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	18
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	98.2 Ft
Length Surveyed	98.20 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 1925	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 1927	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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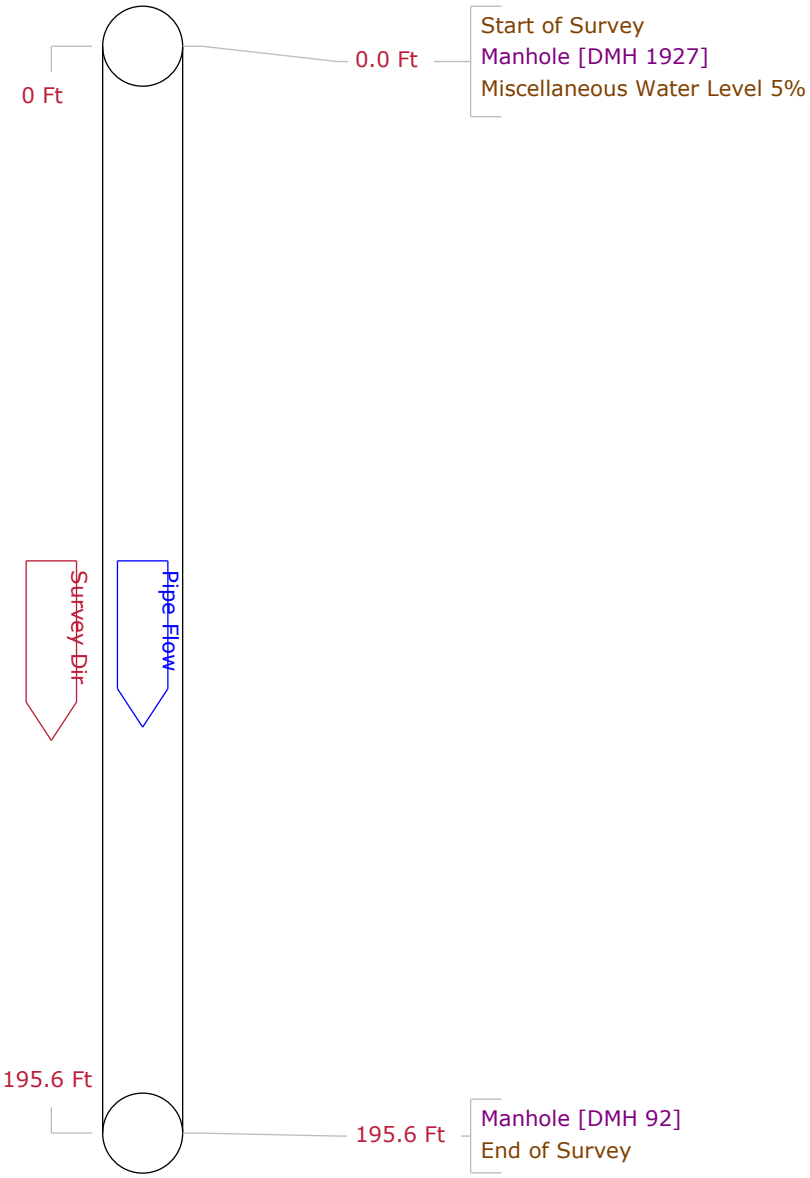
Pipe Graphic Report of PLR DMH 1927 X for Woodard and Curran

Setup	45	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/12	**Time**	13:20	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Springfield St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	18
Width		**ins**			
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	195.6 **Ft**
Length Surveyed	195.60 **Ft**	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 1927	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 92	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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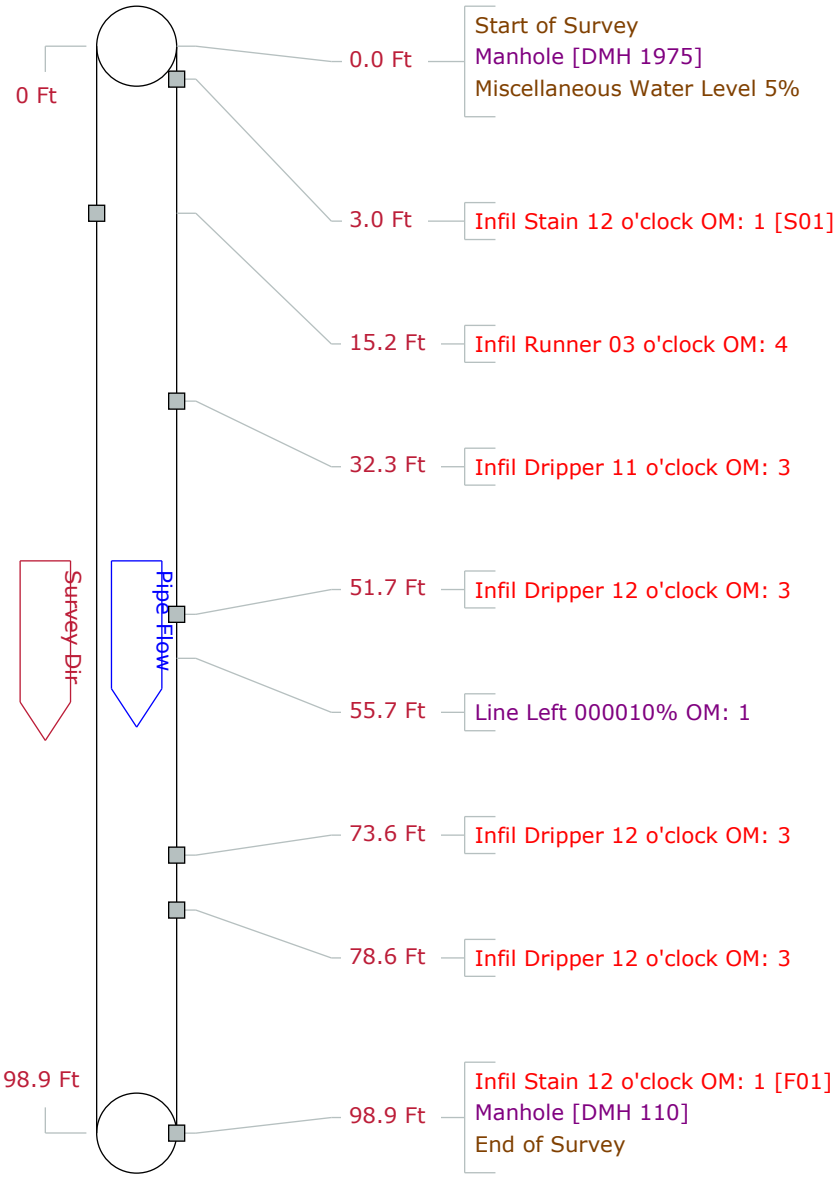
Pipe Graphic Report of PLR DMH 1975 X for Woodard and Curran

Setup 22	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/07	**Time** 9:24	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Springfield St			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 48	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 98.9 Ft	Structural	O & M
Length Surveyed 98.90 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 1975	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 110	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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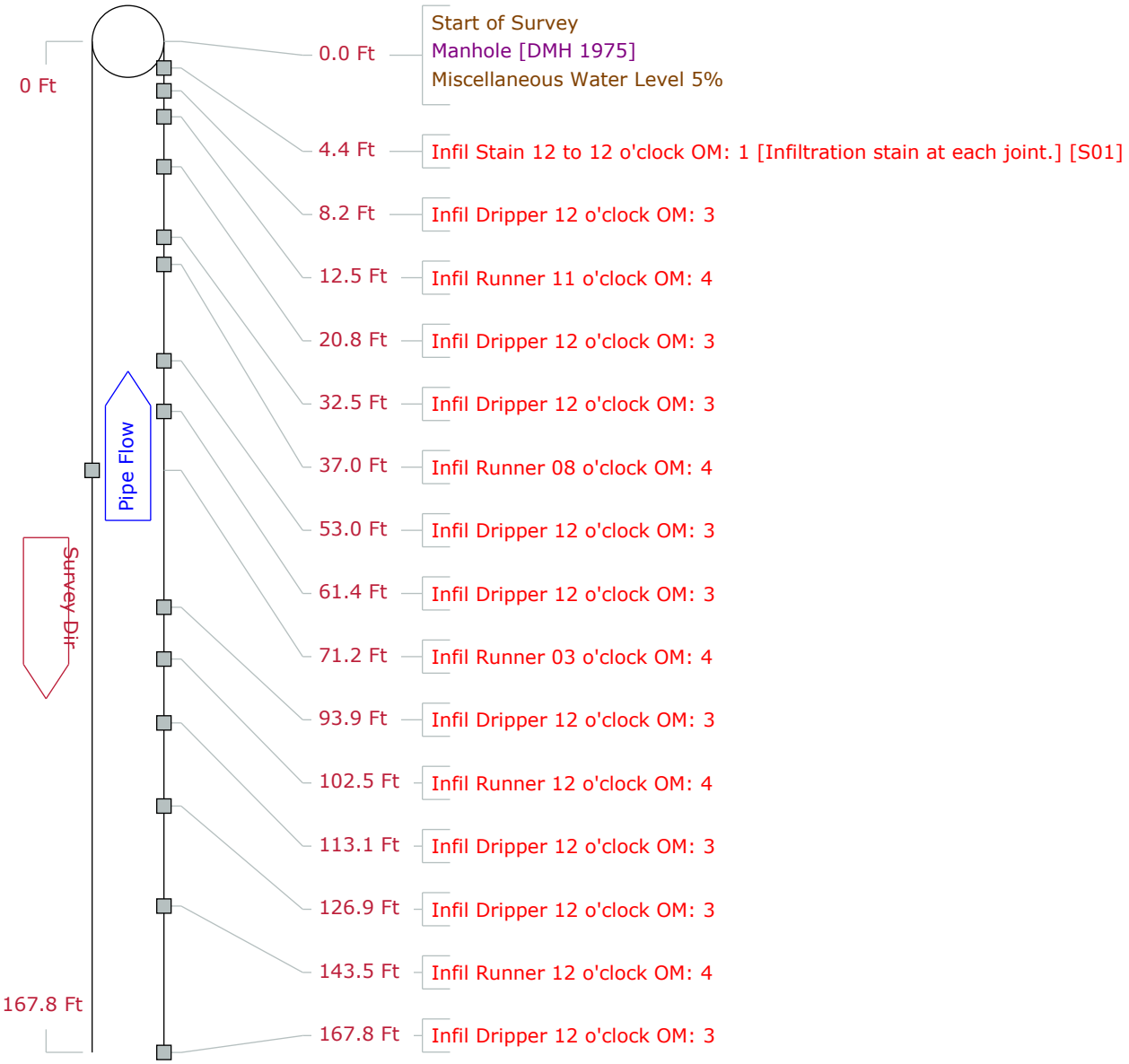
Pipe Graphic Report of PLR DMH 1632 X for Woodard and Curran

Setup 21	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/07	**Time** 8:06	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Upstream
Street Springfield St			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 48	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 503.8 Ft	Structural	O & M
Length Surveyed	503.80 Ft	**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up	DMH 1632	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 1975	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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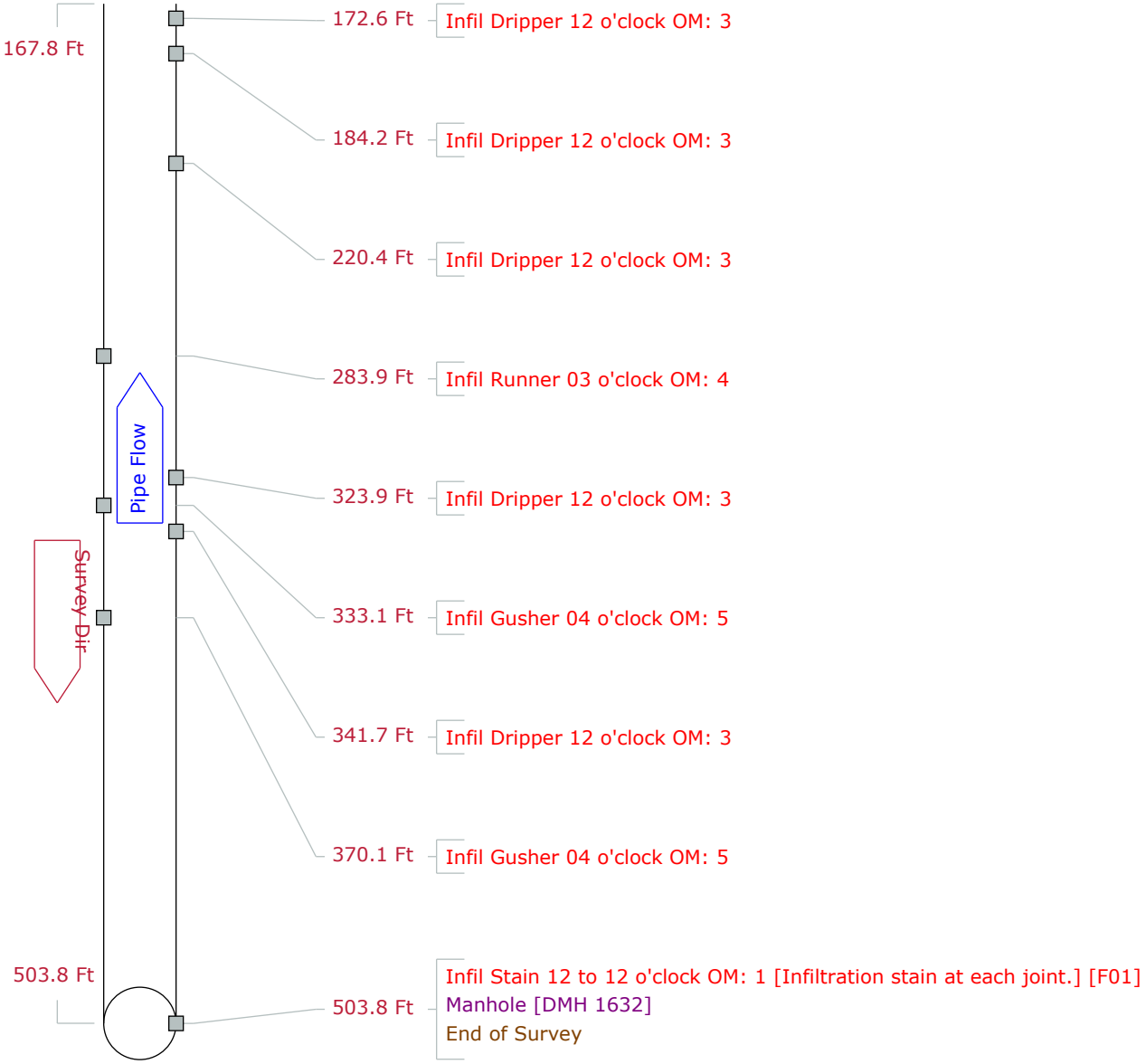
Pipe Graphic Report of PLR DMH 1632 X for Woodard and Curran

Setup 21	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/07	**Time** 8:06	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Upstream
Street Springfield St			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 48	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 503.8 Ft	Structural	O & M
Length Surveyed 503.80 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional
Up DMH 1632		**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 1975		**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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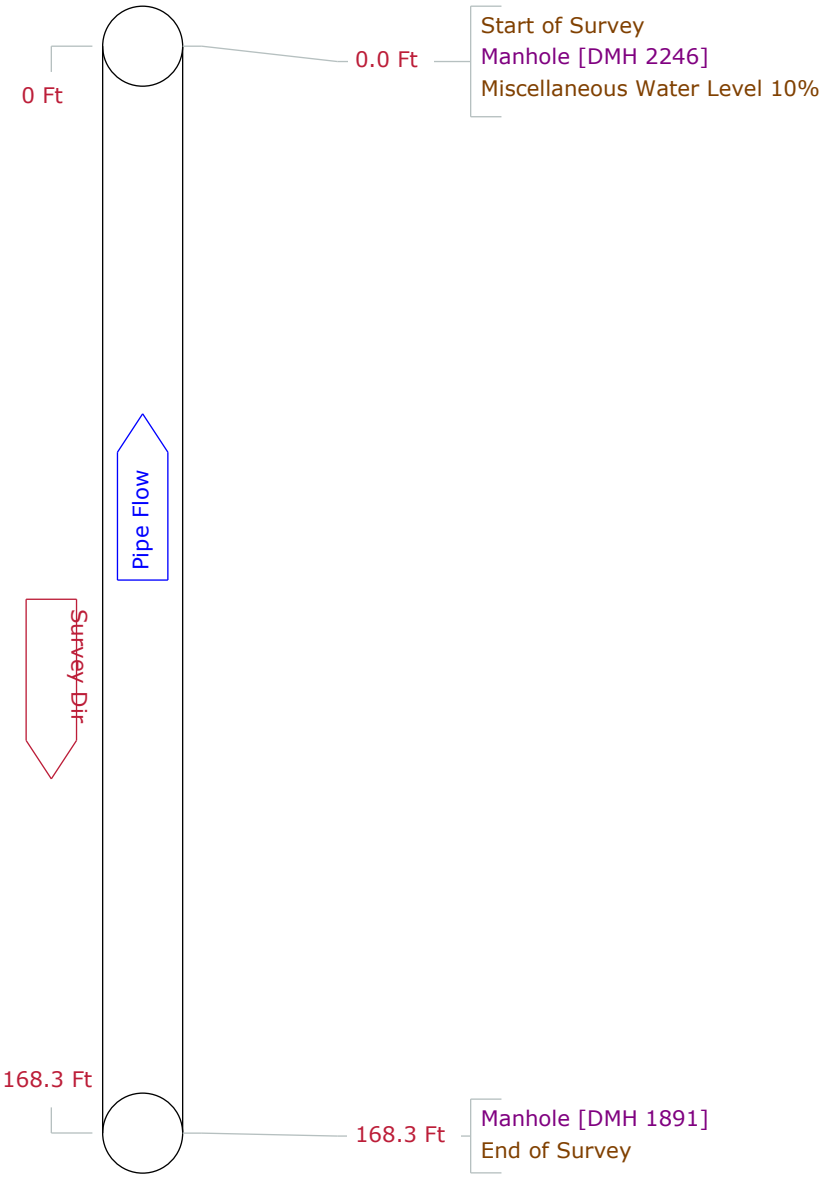
Pipe Graphic Report of PLR DMH 1891 X for Woodard and Curran

Setup	53	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/13	**Time**	13:05	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Upstream
Street	Springfield St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	18
Width		**ins**			
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	**Ft**	**Total length**	168.3 **Ft**
Length Surveyed	168.30 **Ft**	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 1891	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 2246	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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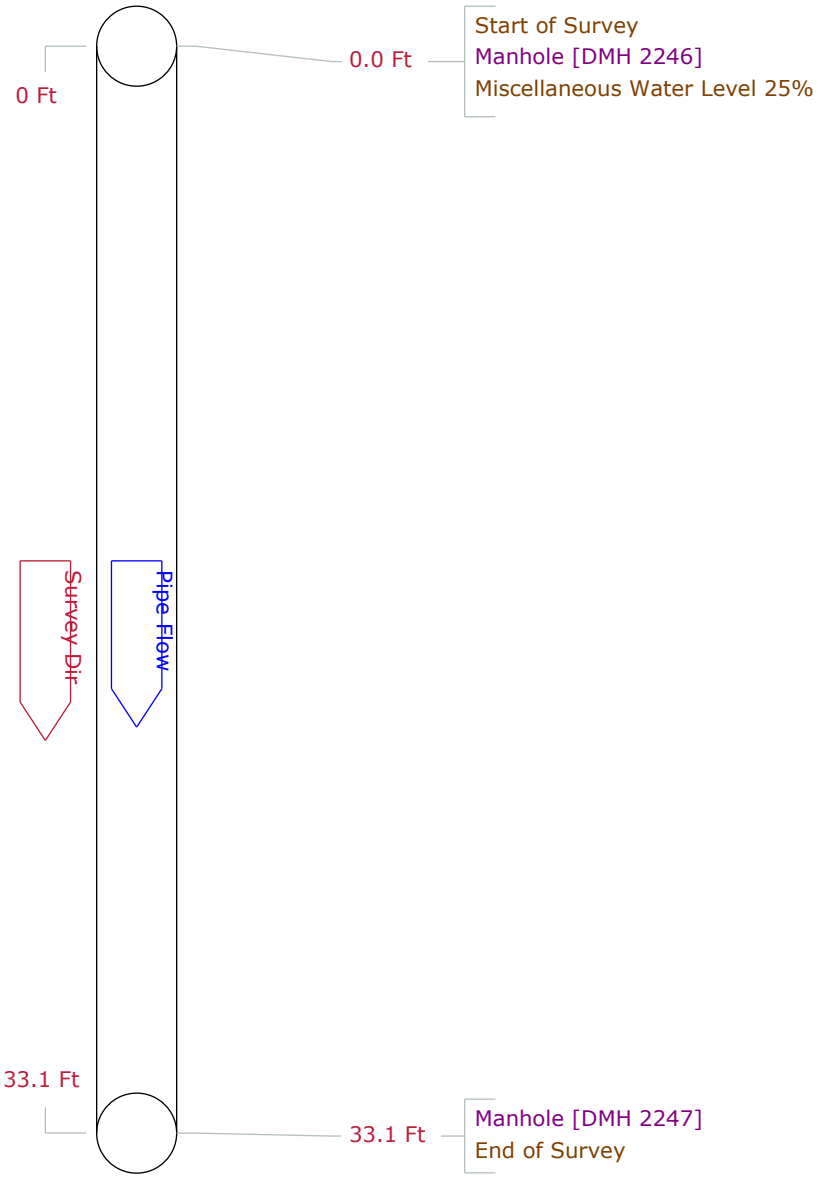
Pipe Graphic Report of PLR DMH 2246 X for Woodard and Curran

Setup	54	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner					
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/13	**Time**	13:13	**Weather**	
Pre-Cleaning	N	**Date Cleaned**			
Flow control		**Survey Purpose**		**Direction**	Downstream
Street	Springfield St.	**City**	Agawam	**Drainage area**	
Location Code				**Pipe Use**	Stormwater Pipe
Location details				**Height**	24
Width	ins				
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	33.1 Ft
Length Surveyed	33.10 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 2246	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 2247	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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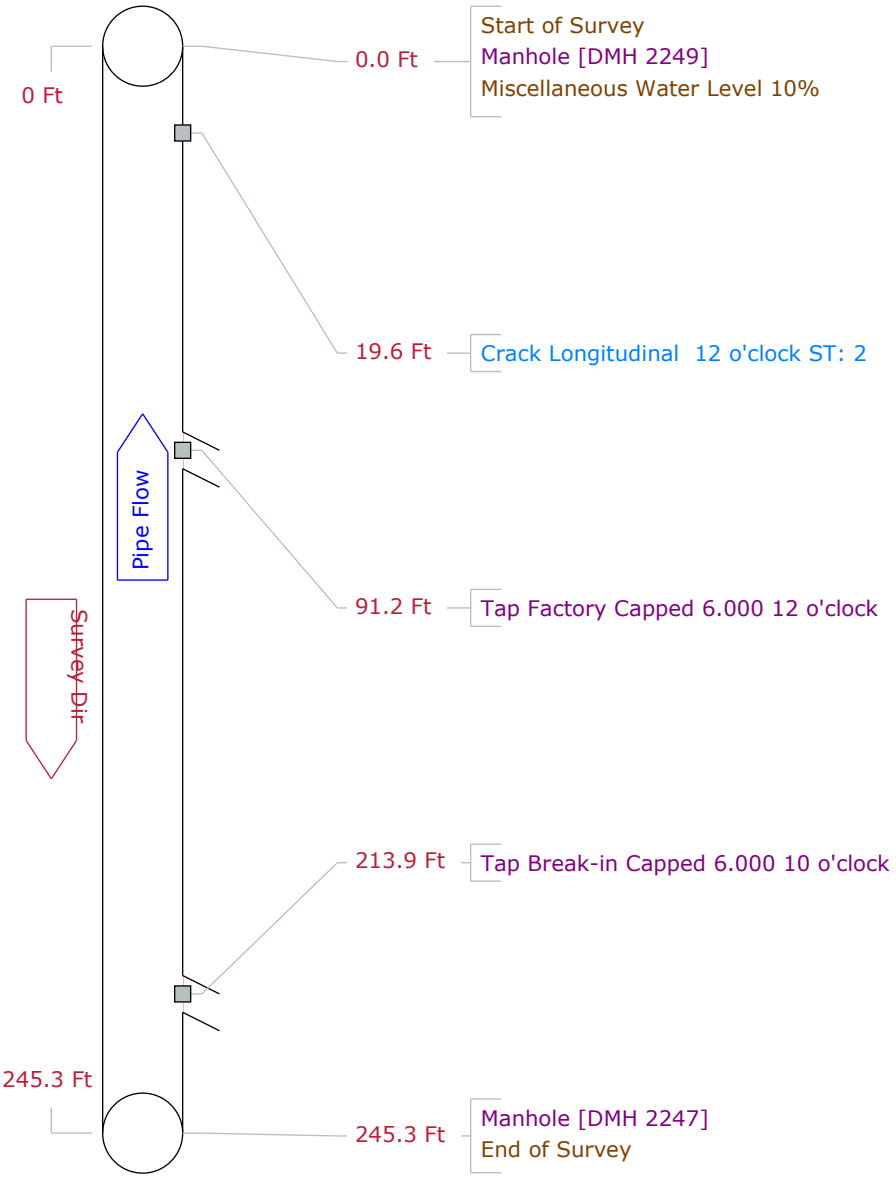
Phone:866-299-3150
Fax:760-406-6023

Pipe Graphic Report of PLR DMH 2247 X for Woodard and Curran

Setup	50	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/13	**Time**	10:42	**Weather**	
Pre-Cleaning	N	**Date Cleaned**		**Flow control**	
Survey Purpose		**Direction**	Upstream		
Street	Springfield St.	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	24	**Width**	ins
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	245.3 Ft
Length Surveyed	245.30 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M
Miscellaneous	Constructional

Up	DMH 2247	**Rim to invert**		**Grade to invert**	**Rim to grade** Ft
Down	DMH 2249	**Rim to invert**		**Grade to invert**	**Rim to grade** Ft



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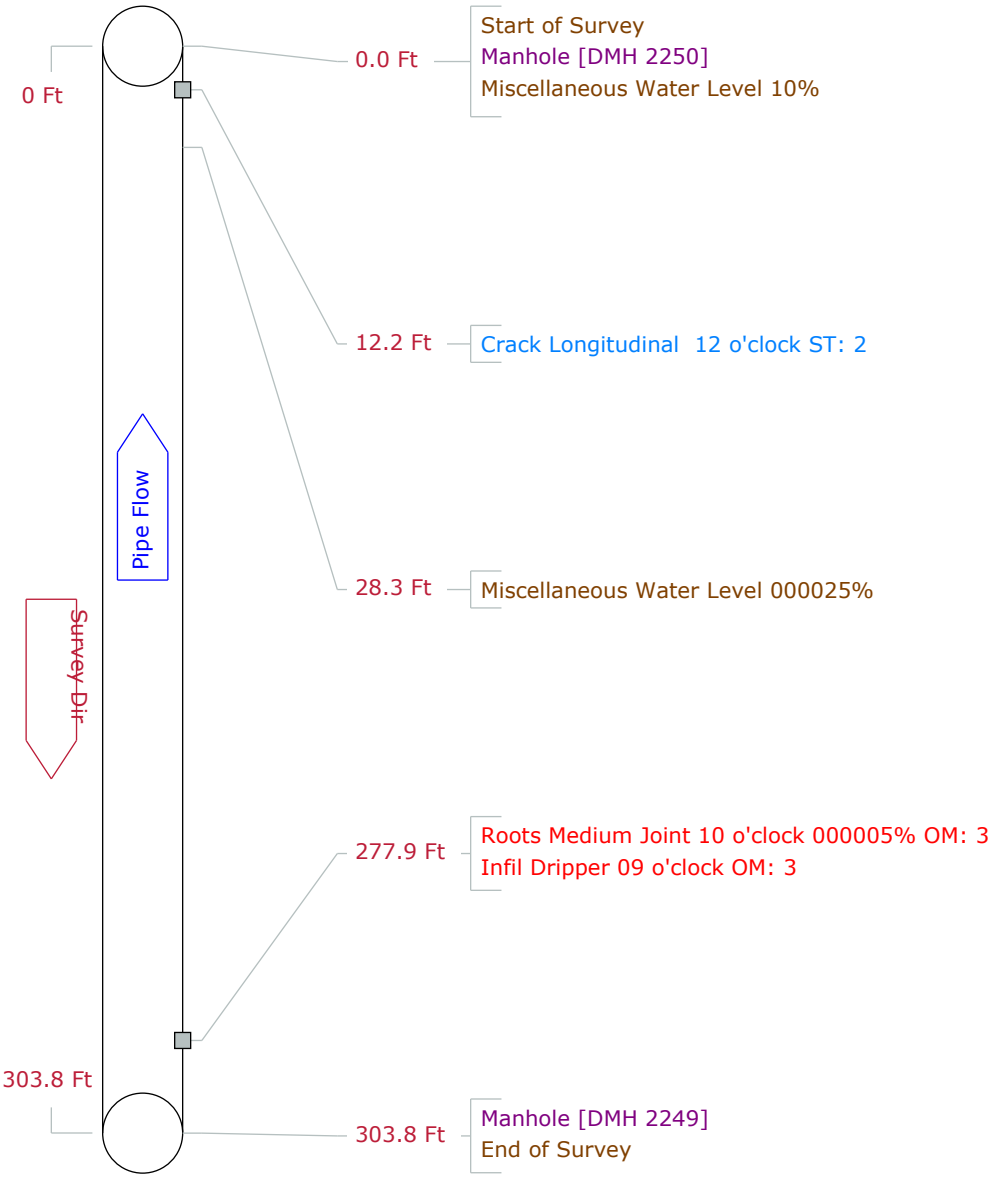
Pipe Graphic Report of PLR DMH 2249 X for Woodard and Curran

Setup	49	**Surveyed By**	ZC	**Certificate #**	614-06021733	**Owner**	
Reviewed By		**Reviewer #**		**Work Order**			
Customer					**P/O #**		
Media Label		**Project**	Agawam Storm Drain CCTV Investigation				
Date	2021/01/13	**Time**	10:35	**Weather**	**Pre-Cleaning** N	**Date Cleaned**	
Flow control		**Survey Purpose**				**Direction**	Upstream
Street	Springfield St.			**City**	Agawam	**Drainage area**	
Location Code					**Pipe Use**	Stormwater Pipe	
Location details					**Height** 24	**Width**	ins
Shape	Circular	**Material**	Reinforced Concrete Pipe		**Lining**		
Coating		**Pipe Joint length**	**Ft**	**Total length** 303.8	**Ft**	Structural	O & M
Length Surveyed	303.80 **Ft**	**Year Constructed**		**Year Renewed**		Miscellaneous	Constructional

Up	DMH 2249	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 2250	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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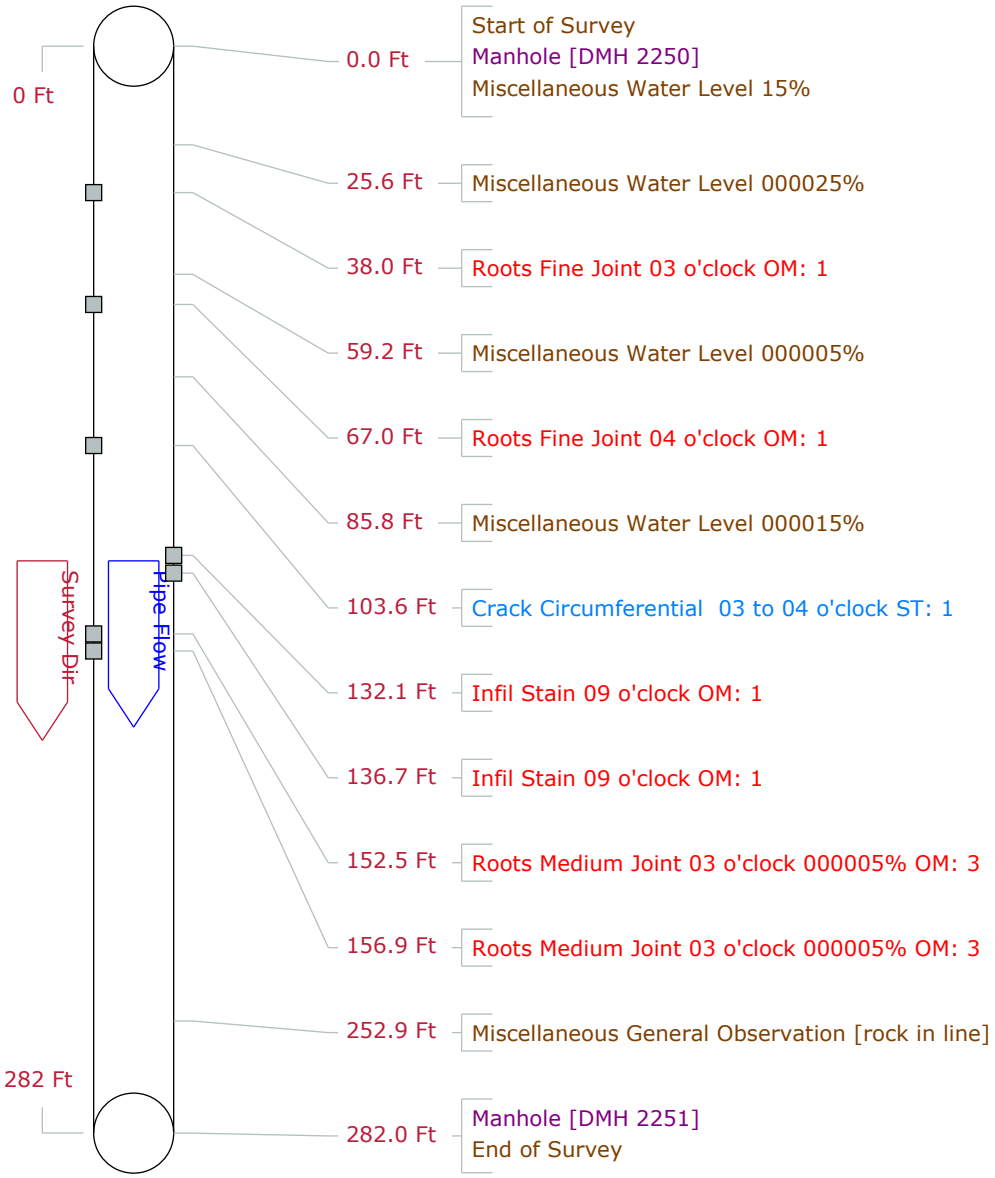
Pipe Graphic Report of PLR DMH 2250 X for Woodard and Curran

Setup 47	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/13	**Time** 8:29	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Springfield St.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 24	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 282.0 Ft	Structural	O & M
Length Surveyed 282.00 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional

Up DMH 2250	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 2251	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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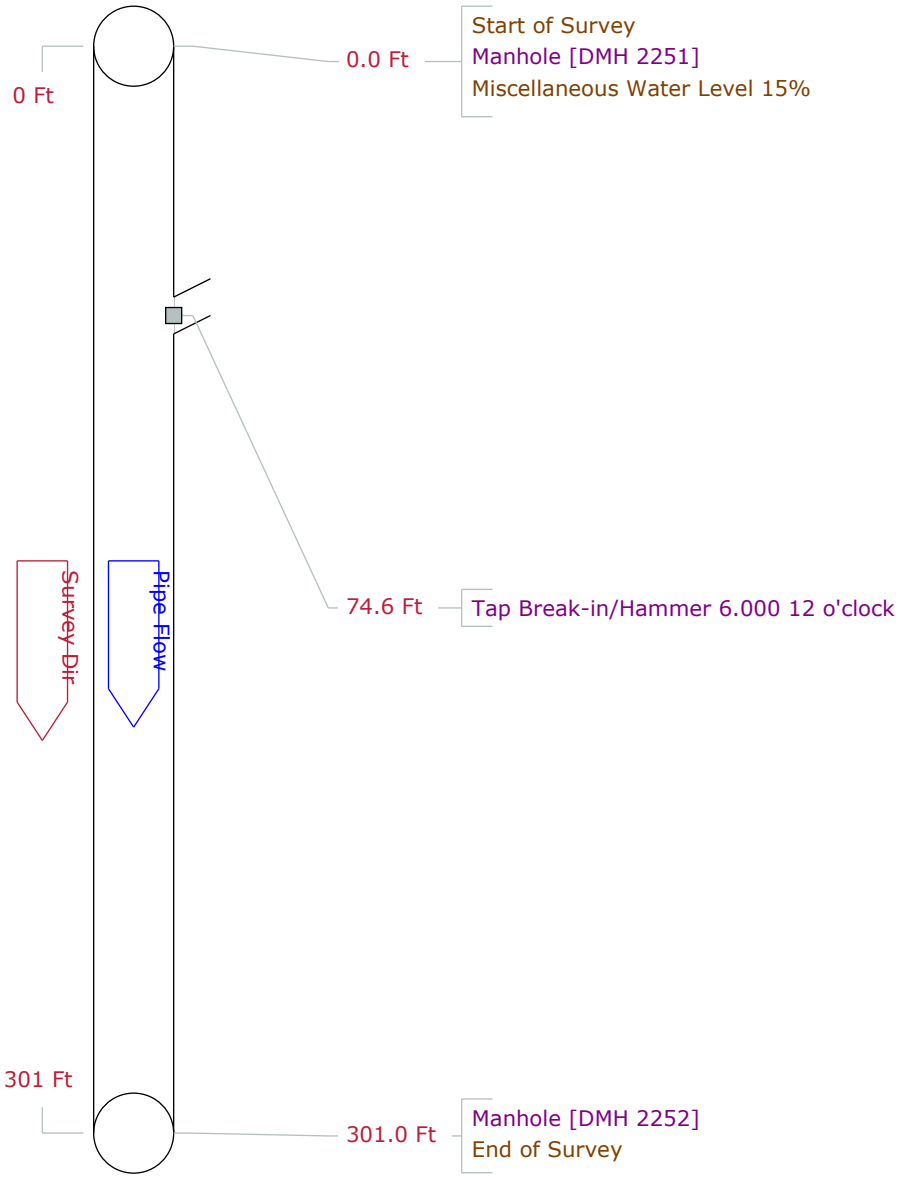
Pipe Graphic Report of PLR DMH 2251 X for Woodard and Curran

Setup 48	**Surveyed By** ZC		**Certificate #** 614-06021733		**Owner**
Reviewed By		**Reviewer #**		**Work Order**	
Customer				**P/O #**	
Media Label		**Project** Agawam Storm Drain CCTV Investigation			
Date 2021/01/13	**Time** 8:49	**Weather**	**Pre-Cleaning** N		**Date Cleaned**
Flow control		**Survey Purpose**			**Direction** Downstream
Street Springfield St.			**City** Agawam		**Drainage area**
Location Code				**Pipe Use** Stormwater Pipe	
Location details				**Height** 24	**Width** ins
Shape Circular		**Material** Reinforced Concrete Pipe		**Lining**	
Coating		**Pipe Joint length** Ft	**Total length** 301.0 Ft	Structural	O & M
Length Surveyed 301.00 Ft		**Year Constructed**	**Year Renewed**	Miscellaneous	Constructional
Up DMH 2251		**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down DMH 2252		**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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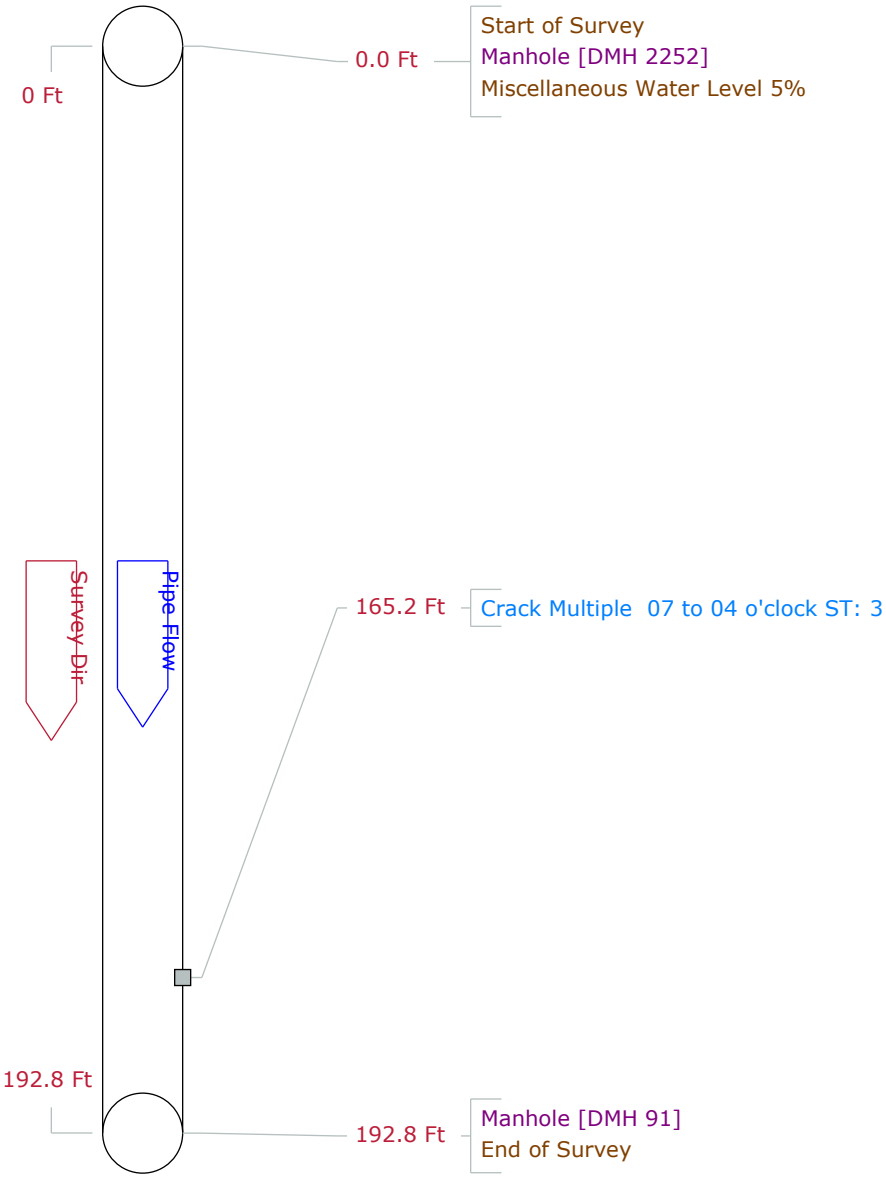
Pipe Graphic Report of PLR DMH 2252 X for Woodard and Curran

Setup	51	**Surveyed By**	ZC	**Certificate #**	614-06021733
Owner		**Reviewed By**		**Reviewer #**	
Work Order		**Customer**		**P/O #**	
Media Label		**Project**	Agawam Storm Drain CCTV Investigation		
Date	2021/01/13	**Time**	11:48	**Weather**	
Pre-Cleaning	N	**Date Cleaned**		**Flow control**	
Survey Purpose		**Direction**	Downstream		
Street	Springfield St.	**City**	Agawam	**Drainage area**	
Location Code		**Pipe Use**	Stormwater Pipe		
Location details		**Height**	24	**Width**	ins
Shape	Circular	**Material**	Reinforced Concrete Pipe	**Lining**	
Coating		**Pipe Joint length**	Ft	**Total length**	192.8 Ft
Length Surveyed	192.80 Ft	**Year Constructed**		**Year Renewed**	

Structural	O & M		
Miscellaneous	Constructional		

Up	DMH 2252	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**
Down	DMH 91	**Rim to invert**	**Grade to invert**	**Rim to grade**	**Ft**



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Storm Drain Infrastructure
Defect Summary by Priority Area

Priority Area	Location	Strucrural Defects Observed	O&M Defects Observed
1	Springfield Street	Cracks	Infiltration
2	Springfield Street	None	Infiltration
3	Walnut Street	None	Roots and Infiltration
4	Bridge Street	Cracks	Infiltration
5	N. Westfield Street	Cracks and Offset Joints	Infiltration
6	Springfield Street	None	None
7	Springfield Street	Cracks	Roots and Infiltration
8	N. Westfield Street Thalia Drive	None	None
9	Columbia Drive Vassar Road Princeton Avenue	Broken Pipe Segment(s), Cracks, Offset Joints	Roots and Infiltration
10	Joanne Circle S. West Street	Surface Deterioration	Roots and Infiltration
11	Dartmouth Street Independence Road	None	None
12	Independence Road	Cracks and Fractures	Infiltration
13	Belvidere Avenue Brookline Avenue	Cracks and Fractures	Roots
14	Memorial Park	Cracks, Fractures, and Offset Joints	Roots
15	Carmel Lane	Broken Pipe Segment(s), Cracks, and Surface Deterioration	None
16	School Street	Broken Pipe Segment(s), Cracks, Holes, Surface Deterioration, and Offset Joints	Roots and Infiltration

Storm Drain Infrastructure
Priority Project Summary

Project Title	Comments & Observations	Prioritization	Project Priority
School Street Drainage Rehabilitation	Severe structural defects found in critical pipe segments (downstream network position).	1	High
Princeton Avenue Drainage Rehabilitation	Slope inconsistencies in pipe causing severe scouring and potential for pipe failure; outlet pipe segments disconnected and causing erosion.	2	High
Belvidere Avenue/Brookline Avenue Drainage Study and Upgrades	Historic flooding/capacity issues in area planned for paving between 2022 and 2026; damaged outfall causing significant erosion (WH-19-302).	3	High
Memorial Park Drainage Rehabilitation	Moderate to severe pipe defects identified requiring both trenched and trenchless rehabilitation; area planned for paving between 2022 and 2026; damaged outlet pipe causing significant erosion (TM-20-293).	4	Medium
Town-Wide Storm Drain CCTV Inspection Program	Conduct proactive and ongoing investigations to monitor storm drain infrastructure and identify defects prior to failure.	5	Medium
Town-Wide Storm Drain Rehabilitation	Provide heavy cleaning, trenchless rehabilitation, and/or open cut (dig and replace) services on an ongoing basis to address defects identified during Town-wide CCTV inspections.	6	Medium
Town-Wide Outfall Rehabilitation	Address damages and maintenance needs identified during MS4 dry weather outfall assessments.	7	Medium
Town-Wide IDDE Program	Advance IDDE catchment investigation, wet weather outfall screening, and illicit discharge notification, abatement, and removal confirmation efforts for the duration of the MS4 General Permit cycle.	8	Medium

APPENDIX D: DETENTION BASIN ASSESSMENT MAPS & TABLES

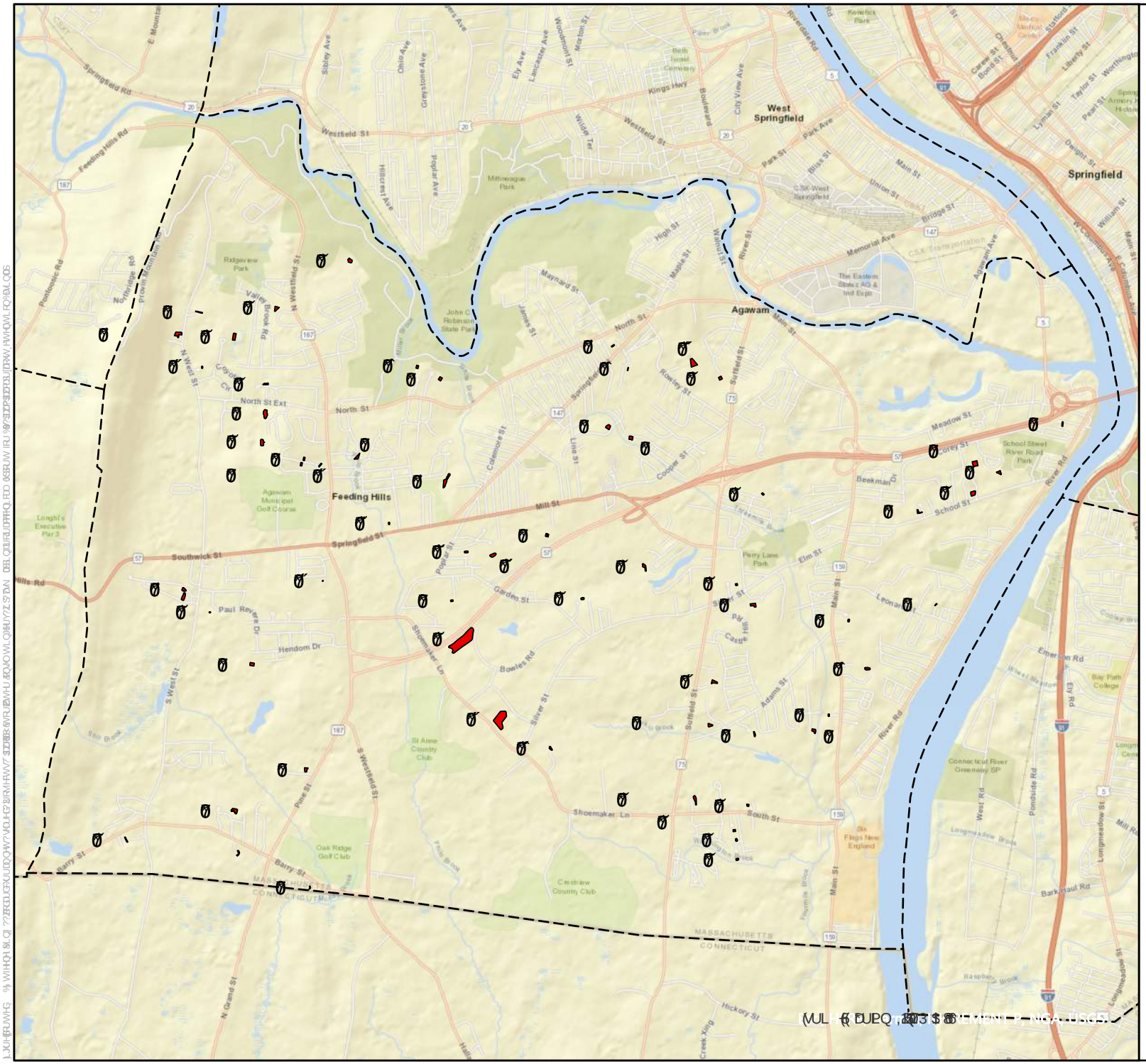

Figure 6-1: Detention Basins

N

WOODARD & CURRAN

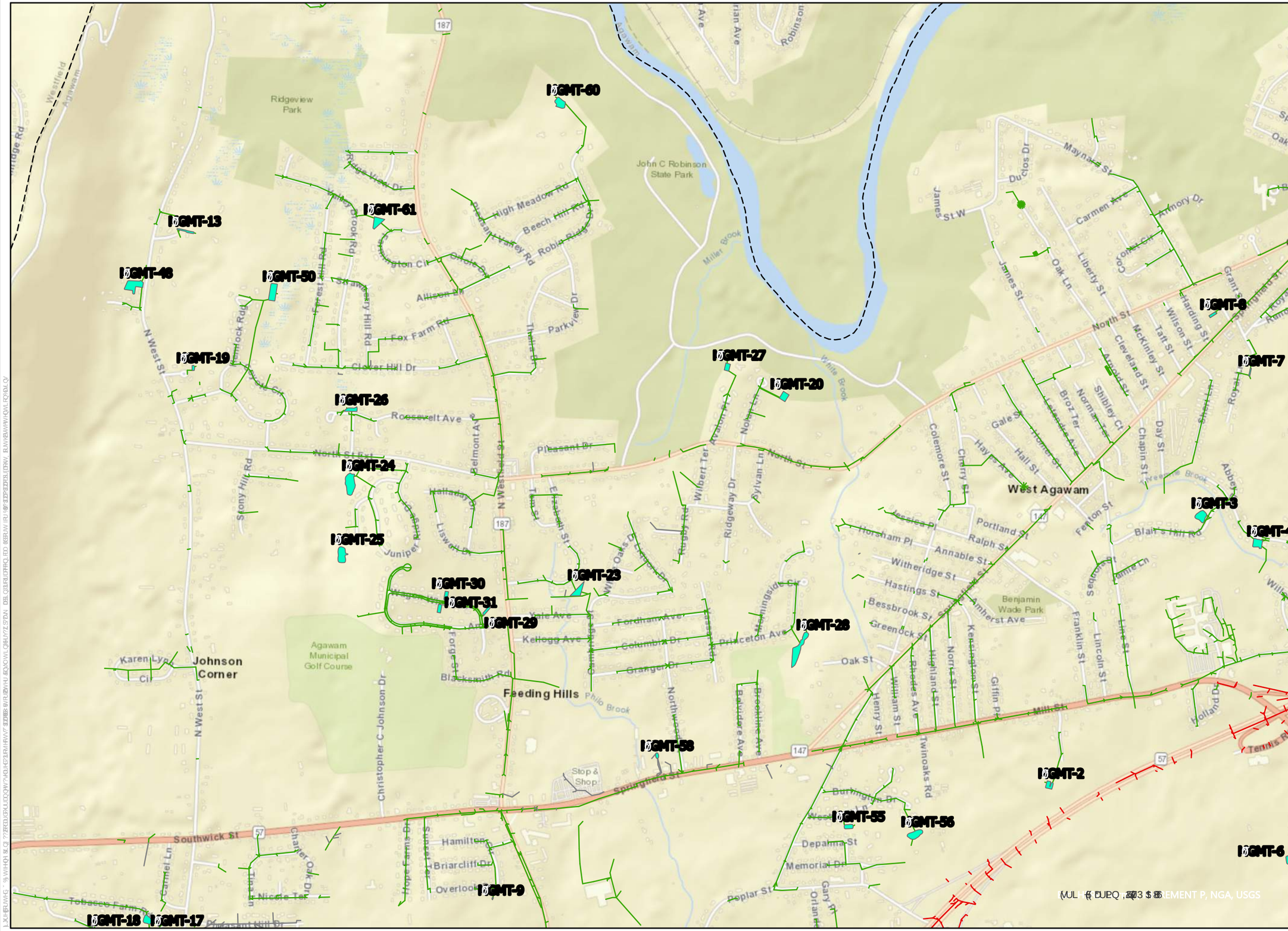

Figure 6-2: Northwest Detention Basins

$DZDP $

N

/HJHQG

HWHQWLRQ%DVLQV

6WRUPIDLQ

ZQHU

0QLFLSDO

3ULYDWH

6WDWH

8QNQRZQ

LQ IW

WOODARD & CURRAN

3URMHFW

DS&JHDWHG, RYHEHU

7KLUGSDUW\6\VFODLPU, 7KLVESLVIRU

UHHUHQFHDQGJUDSKLFDO SXUSRVHVRQO\DQG

VKRXOGQRW EHUHOLHGXSRQEWKLUGSDUWLHVIRU

DQ\OHDO GHFLVLRQV $QUHOLDQFHXSRQWKH

IDSRU GDWDFRQWDLQHGKHUHLQVKDOO EHDW WKH

XVHUV¶ VRO HUL VBWDSXUFH/

(VUL 6 DUPQ ,2003 $ 86

EMENT P, NGA, USGS

Figure 6-3: Northeast [illegible] Detention Basins [illegible]

[illegible]

N

Legend

- [illegible] Watershed Boundary
- [illegible] Sub-Watershed Boundary
- Stormwater Flow
- Culvert
- Stream
- Open Space

WOODARD & CURRAN

[illegible]

Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS User Community

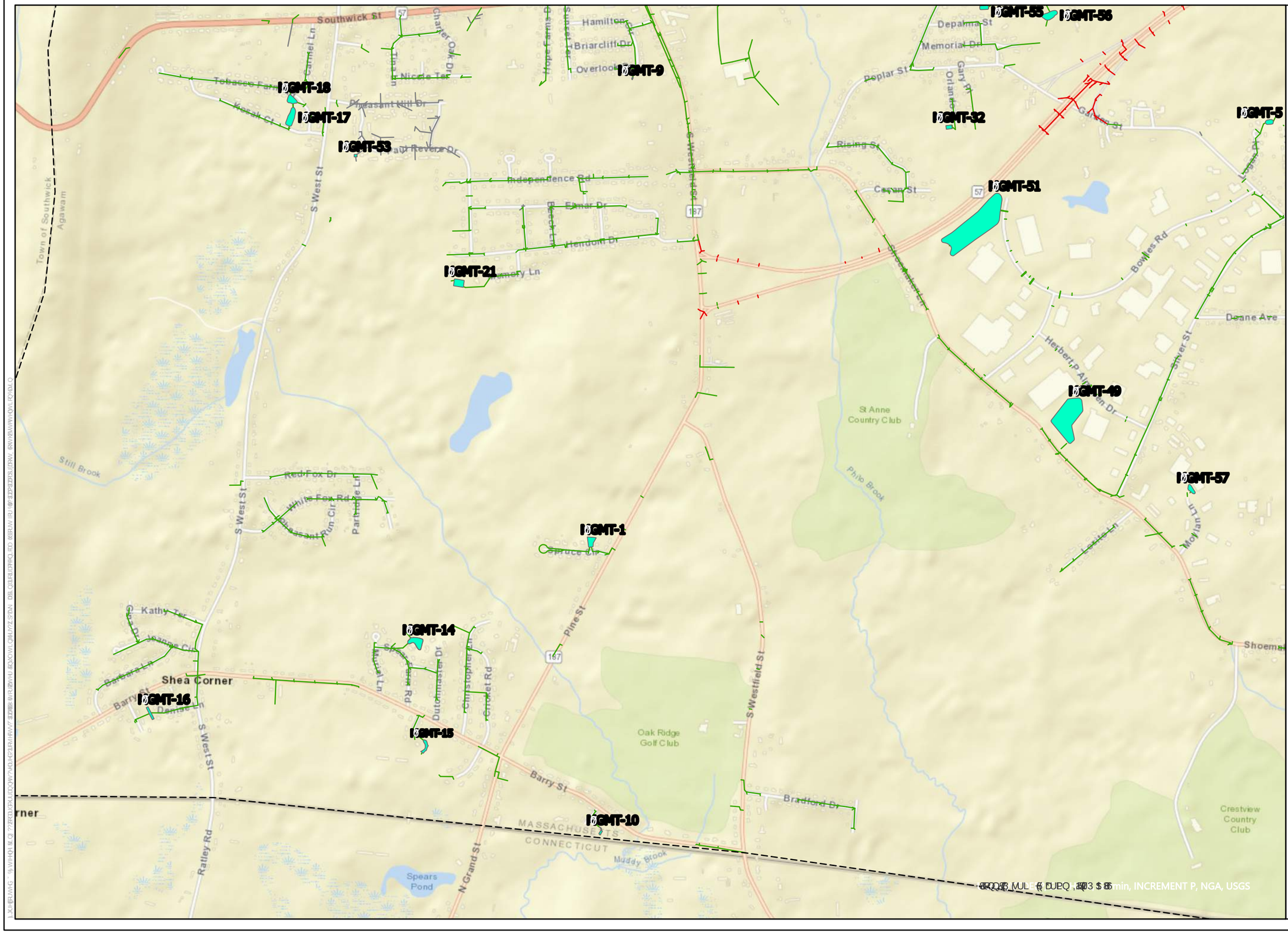

Figure 6-4: Southwest Detention Basins

N

LQ IW

WOODARD & CURRAN

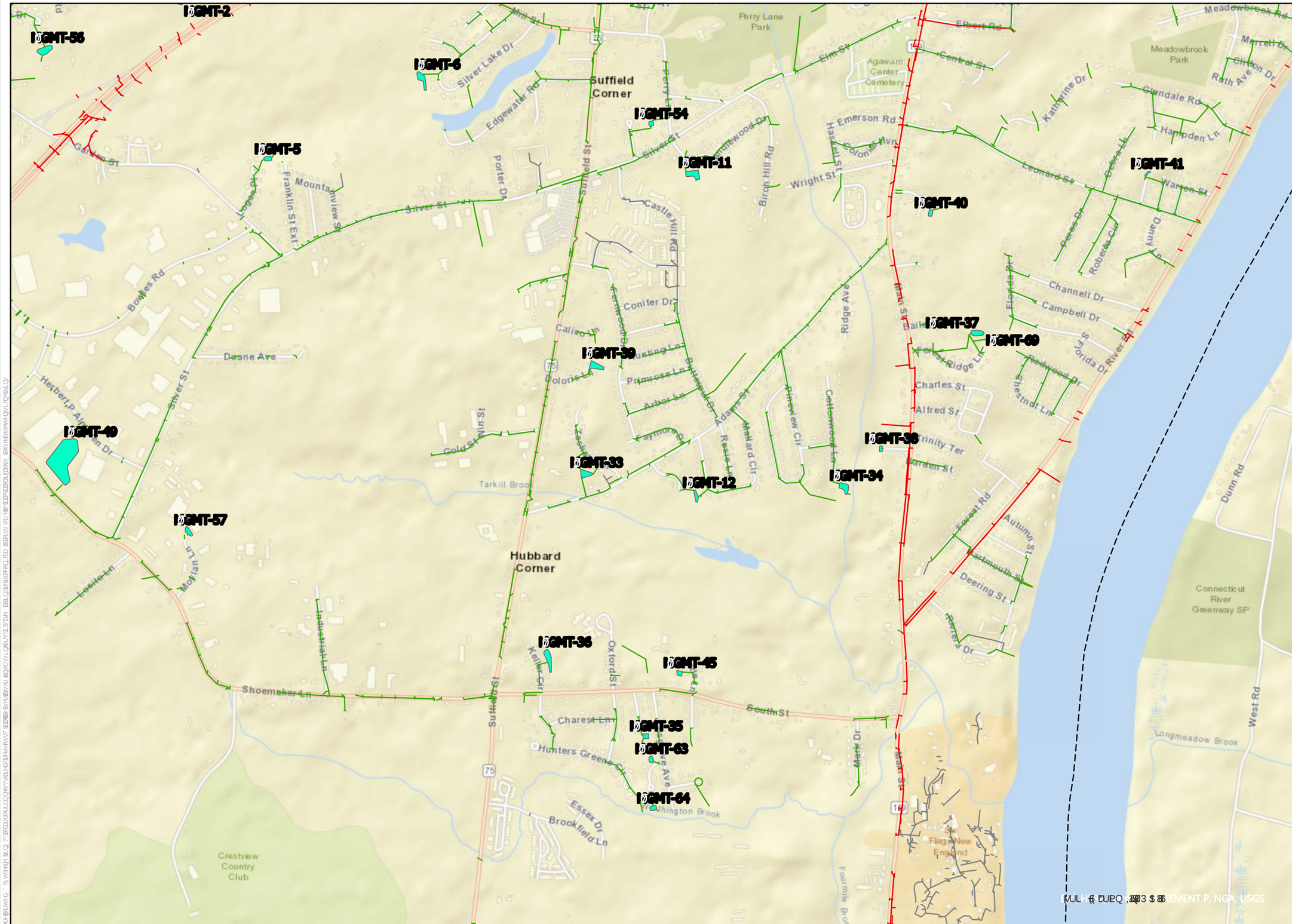

Figure 6-5: Southeast Detention Basins

$DZDP $

N

/HJHQG

HWHQWLRQ%DVLQV

6RZQV IURRXUYH3RLQWV

6WRUPIDLQ

ZQHU

0QLFLSDO

3ULYDWH

6WDWH

8QNQRZQ

LQ IW

WOODARD & CURRAN

3URMHFW

DS&UHDWHG 1RYHEHU

7KLUG3DUW\6\VRODLPU 7KLVPSLVIRU

UHHUHQFHDQGJUDSKLFDO SXUSRVHVRQO\DQG

VKRXOGQRW EHUHOLHGXSRQEWKLUGSDUWLHVIRU

DQOHDO GHFLVLRQV $QUHOLDQFHXSRQWKH

PSRU GDWDFRQWDLQHGKHUHLQVKDOO EHDW WKH

XHUV\ VRHUL VDWDSXUFHV

WULHQ 6 DUPQ 2003 $ 86

EMENT P, NGA, USGS

Agawam Detention Basin Assessment Form

Initial Information Section

- Inspection Date:
- BMP ID:
- BMP Location:
- Inspector Name:
- Date & Time of Last Precipitation:
- Depth of Last Precipitation:
- Facility Owner (Municipal, Private, State, Other):

Condition Section (Not a Problem, Monitor [potential for future problem], Work Needed, N/A)

- Embankment:
- Sideslopes:
- Woody Vegetation on Embankments or Sideslopes:
- Pretreatment Measure/Forebay:
- Inlet:
- Impoundment Area:
- Outlet Control Structure:
- Trash Racks:
- Spillway:
- Plantings:
- Maintenance Access:
- Rodent Control:

Comment Section

- Maintenance Needs:
- Inspection Comment:
- Retrofit Potential (High, Medium, Low):
- Retrofit Description/Comment:
- Photos and Files:

Detention Basin Assessment Summary

BMP ID	BMP Location	Inspection Date	Inspector Name(s)	Facility Owner	Condition of Embankment	Condition of Side Slopes	Woody Vegetation on Embankments or Side Slopes	Condition of Pre-Treatment Measure/Forebay	Condition of Inlet	Condition of Impoundment Area	Condition of Outlet Control Structure	Condition of Trash Racks	Condition of Spillway	Condition of Plantings	Maintenance Access	Rodent Control	Inspection Comments	Retrofit Potential	Retrofit Description/Comments
MGMT-1	Spruce Circle	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Monitor	Not Applicable	Not Applicable	Monitor	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Side slopes show and base have bare spots. Evidence of scouring at outlet, owner of property maintains it.	Low	Could put plantings to promote infiltration. Basin is in someone's yard and seems to be used as recreational space.
MGMT-2	Windermere Drive	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Monitor	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Sediment around inlet needs to be cleaned out.	High	Install trash rack and a better outlet control structure. Basin appears to be functioning well, there might not be much added benefit from retrofitting.
MGMT-3	Blaire's Hill Road	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Monitor	Not a Problem	Not Applicable	Monitor	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Inlet pipe slightly clogged with leaves, inlet has plunge pool, can see start of erosion on side slopes, standing water in basin, emergency spillway is an outlet control structure	Low	Add trash racks on outlet structure, orpheus on outlet structure could be raised to hold more water
MGMT-4	Lancaster Drive	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Monitor	Great condition. Two inlets from downspouts on neighboring house, one seems disconnected and the other is connected. Outlet structure has PVC pipes assumed to be placed by a resident that can be used for dumping into outlet structure.	Medium	Cannot increase size because of electric lines and pillars on the edge. Could put trash racks on outlet structure.
MGMT-5	Logan Place	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Work Needed	Not Applicable	Not Applicable	Monitor	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Outlet control structure could be leaching. Outlet is unmapped near the middle of the basin (close to where start of drain line is). Side slope is eroding and partially collapsed on some sides. Yard waste dumping next to basin. Riprap on almost entire base of impoundment. Fence is partially collapsed on northern and southern sides where erosion is.	Medium	Small drainage area, could raise outlet control structure and add no dumping sign. Could take out rip rap and establish plantings to promote infiltration.
MGMT-6	Silver Lake Drive	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Monitor	Monitor	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Outlet is a broad crested weir with a v notch spillway. Trash and yard waste dumping. Lots of woody vegetation on side slopes.	Medium	Basin appears to be functioning as intended. Maintenance is highest priority. Can establish more wetlands plantings in the basin and add a no dumping sign.
MGMT-7	Royal Lane	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Monitor	Work Needed	Not a Problem	Not Applicable	Work Needed	Monitor	Not Applicable	Not Applicable	Work Needed	Monitor	Monitor	Not Applicable	Basin surrounded by dense vegetation. Lots of trash and grass dumping. Unable to locate outlet. Both inlets mostly clogged with leaves and sediment. Concrete head wall around southern inlet. Appears the the base elevation of impoundment area is almost higher than southern inlet. Some erosion on banks.	High	Could make it deeper, put outlet control structure, could restore plantings
MGMT-8[1]	Kristin Street	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Monitor	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not a Problem	Not a Problem	BMP is a subsurface chamber system in a resident's backyard. High point in elevation, only 2 catch basins feed into system. Could not find access manhole (may not exist).	N/A	N/A
MGMT-9[1]	Overlook Drive	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not a Problem	Not Applicable	Not Applicable	Not a Problem	Not Applicable	Not Applicable	Not a Problem	Not a Problem	BMP appears to be a leaching catch basin. Could be leaching basin. Has a 3" HDPE pipe coming in from yard. BMP is at high point in drainage system.	N/A	N/A
MGMT-10	Oakmont Place	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Work Needed	Work Needed	Not Applicable	Work Needed	Not a Problem	Not Applicable	Not a Problem	Not Applicable	Erosion and scouring at inlet, inlet grate clogged with leaves, layer of sediment in inlet, rip rap at inlet	High	Excavate deeper to store more water, implement proper outlet control structure, revegetate base of impoundment
MGMT-11[2]	Pembroke Lane	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Monitor	Monitor	Monitor	Unknown	Unknown	Not a Problem	Unknown	Unknown	Unknown	Monitor	Work Needed	Unknown	Basin is very difficult to access. Gate was not located. Basin impoundment is very overgrown with wetland plants. Could not see inlet or outlet structures. Unable to complete inspection.	Low	Appears that a good amount of impervious area could be draining here. Worth re-evaluating once basin has been maintained.
MGMT-12	Richardson Place	11/20/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Monitor	Work Needed	Not Applicable	Work Needed	Work Needed	Work Needed	Work Needed	Work Needed	Work Needed	Not a Problem	Not a Problem	Very overgrown with trees. Tree growing through outlet structure. Dumping of yard waste along fence line. Most of inlet is clogged with leaves. Culverts 54-56 run adjacent to eastern edge of basin. They appear to be in working condition in passing a small stream from what we can tell. Bank of stream around culvert is eroding.	Medium	Make deeper, build berm higher, raise outlet control structure, clean out basin could allow for infiltration, expand basin to the North.
MGMT-13	Cynthia Place	11/17/2020	Bradley Mustain Leyna Tobey	Municipality	Monitor	Monitor	Not Applicable	Not Applicable	Work Needed	Work Needed	Monitor	Not Applicable	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Catch basin near inlet has settled and is in poor condition. Minimum volume flowing to basin. Needs maintenance, full of leaves and overgrown. No outlet control structure, just 12" HDPE pipe leaving berm to adjacent wooded area.	Low	Could put outlet control structure to get more storage capacity, doesn't appear to get enough flow to basin to make sense

Detention Basin Assessment Summary

BMP ID	BMP Location	Inspection Date	Inspector Name(s)	Facility Owner	Condition of Embankment	Condition of Side Slopes	Woody Vegetation on Embankments or Side Slopes	Condition of Pre-Treatment Measure/Forebay	Condition of Inlet	Condition of Impoundment Area	Condition of Outlet Control Structure	Condition of Trash Racks	Condition of Spillway	Condition of Plantings	Maintenance Access	Rodent Control	Inspection Comments	Retrofit Potential	Retrofit Description/Comments
MGMT-14	Middle Lane	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Monitor	Not Applicable	Not Applicable	Work Needed	Monitor	Work Needed	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Monitor	Small tree growing through inlet. Small holes in side slope and signs of chewing at outlet suggests rodents are present. Yard waste dumping in basin, discharges to OF, dumping in discharge stream, lots of dumping at stream, embankment surrounding outfall is eroding	Medium	Implement outlet control structure
MGMT-15	Marla Place	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Work Needed	Work Needed	Not a Problem	Not Applicable	Monitor	Work Needed	Work Needed	Not Applicable	Work Needed	Not Applicable	Not a Problem	Not Applicable	Discharges to UN-2-289 which flared end section of outlet pipe is disconnected. Clear erosion where water flows through the basin, wetlands flagging around lower half of the basin, emergency spillway and embankment around outlet pipe eroding and need repair, yard waste dumping	Medium	Replicate wetlands, add no dumping sign
MGMT-16	Denise Lane	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Monitor	Work Needed	Not Applicable	Work Needed	Not a Problem	Not Applicable	Not Applicable	Not Applicable	Work Needed	Work Needed	Not Applicable	Neighbors mow their portions of the basin. The area where inlet pipes come in is completely overgrown with large trees and is not taken care of. Side slopes have some bare spots. Trucks can access basin, but inlet access is an issue with overgrowth	Low	Can dig area near inlets deeper for more infiltration and install plantings to filter, but residents clearly use basin as recreational area. Work needed to repair inlet area
MGMT-17	Tobacco Farm Road	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Monitor	Not a Problem	Not Applicable	Monitor	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Some erosion at inlet, new septic next to basin on West side, very wooded, it appears the emergency spillway is the two pipes leading to MGMT-18, bare spots on side slopes, standing water. Banks of adjacent stream are starting to erode. Resident came out and explained that basin used to be clear cut with grass.	Low	No retrofit potential identified
MGMT-18	Tobacco Farm Road	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Monitor	Work Needed	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Work Needed	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Lots of woody vegetation, we believe this basin is downstream from basin 17, trash rack has fallen off of orifice on outlet control structure, standing water. Could be constructed wetland, infiltration, or wet detention, but it is not dry detention.	Low	No retrofit potential identified
MGMT-19	Katy Lane	11/17/2020	Bradley Mustain Leyna Tobey	Municipality	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Work Needed	Monitor	Not a Problem	Not Applicable	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Inlet approximately 6" above ground with some evidence of erosion. Bottom of basin full of leaves and small plants.	High	Put in outlet structure. Could install media filter. Not a lot of drainage area coming to it, would be easy project.
MGMT-20	Nolan Land	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Work Needed	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Not Applicable	Straight infiltration basin with two inlets and no outlet or spillway. One inlet buried and other inlet has some sediment build up. Some erosion on downstream side of inlet pipes.	High	Lots of capacity to route more storm water here. Could put rip rap at outlets.
MGMT-21	Memory Lane	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Work Needed	Monitor	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Work Needed	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Small tree fallen on part of fence, discharges to ST-4-487, water coming from beneath of outfall (pipe disconnected or hole in outlet structure). Outlet is inaccessible, cannot determine if there is a trash rack. Emergency spillway is above outlet pipe. Very wooded and overgrowth, needs maintenance.	Low	Could put outlet control structure to increase water quality volume.
MGMT-22	Alice Lane	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Work Needed	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Inlet clogged and overgrown, no emergency spillway on top of outlet structure, trash rack should be cleaned o outlet structure, large amount of volume that is appearing to not be used. Inlet is at the low point of basin and 20' away from the outlet.	High	Pull inlet pipe back towards road and give it larger ground area to infiltrate. Add sediment forebay
MGMT-23	Elizabeth Street	11/17/2020	Bradley Mustain Leyna Tobey	Municipality	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Monitor	Monitor	Not a Problem	Leaves in front of inlet need to be removed. Could use trash rack on outlet structure. Plantings not matured. Appears to be gravel wetlands? Outlet control structure has 2 8-inch inlets then grate on top for emergency overflow to 30-36" pipe. Raised garden beds have been installed in the corner of basin. Directly east of Philo Brook.	Low	Infiltration area of water table not high. Could restore gravel wetlands and re-instate plantings. Could add forebay by cutting inlet pipe back.
MGMT-24	Cedar Knoll Drive	11/17/2020	Bradley Mustain Leyna Tobey	Municipality	Work Needed	Work Needed	Monitor	Not Applicable	Not Applicable	Monitor	Monitor	Not Applicable	Monitor	Not a Problem	Work Needed	Not a Problem	Inlet not accessible. Basin overgrown. No easy maintenance access (truck cannot access). Beginning of erosion on embankment where outlet is located. Grass clippings and leaves dumped in basin.	Medium	Water quality improvements possible. Some increased storage possible. Install no dumping sign. Could be good infiltration basin location.

Detention Basin Assessment Summary

BMP ID	BMP Location	Inspection Date	Inspector Name(s)	Facility Owner	Condition of Embankment	Condition of Side Slopes	Woody Vegetation on Embankments or Side Slopes	Condition of Pre-Treatment Measure/Forebay	Condition of Inlet	Condition of Impoundment Area	Condition of Outlet Control Structure	Condition of Trash Racks	Condition of Spillway	Condition of Plantings	Maintenance Access	Rodent Control	Inspection Comments	Retrofit Potential	Retrofit Description/Comments
MGMT-25	Cedar Knoll Drive	11/17/2020	Bradley Mustain Leyna Tobey	Municipality	Work Needed	Work Needed	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Work Needed	Not Applicable	Work Needed	Not Applicable	Monitor	Not Applicable	Embankment around spillway was eroded and in need of repair. Grass swale discharges into basin, collects little impervious area.	Low	Basin looks like it takes limited impervious area.
MGMT-26	Roosevelt Avenue	11/17/2020	Bradley Mustain Leyna Tobey	Municipality	Monitor	Monitor	Monitor	Not Applicable	Monitor	Work Needed	Monitor	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Woody vegetation falling towards basin. Evidence of people dumping grass clippings here. Overgrown. Outlet pipe tilted sideways, no riser structure.	High	Add no dumping sign. Great opportunity for water quality improvements, not quantity. Redo outlet and add structure. Entirely overgrown, clean up basin, add filter media or plantings
MGMT-27	Avalon Place	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Work Needed	Not a Problem	Not a Problem	Monitor	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Tree growing through inlet pipe, dumping on side slopes, overall good condition	Medium	Opportunity for sediment forebay (there may be one currently, but stones don't stretch full length of basin
MGMT-28	Princeton Avenue	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Work Needed	Work Needed	Not Applicable	Not Applicable	Work Needed	Work Needed	Not Applicable	Monitor	Not a Problem	Not a Problem	Not a Problem	Monitor	Outfall to a stream, not serving as a basin. Banks are eroding where discharge enters stream, and stream banks are eroded. There is dry weather flow, evidence of dumping (leaf litter). Rip rap and plunge pool at basin inlet, erosion at inlet head wall. Erosion comes from water draining down driveways into basin. Outlet pipe is buried but seems to be functioning.	Low	Discharge is right next to stream, does not seem worth it to reconstruct if stream is apart of basin impoundment. Basin acts as flood control for the stream that runs through it rather than the storm drain system.
MGMT-29	Wagon Wheel Drive	11/17/2020	Bradley Mustain Leyna Tobey	Municipality	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Monitor	Work Needed	Work Needed	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Impoundment area has a large amount of yard waste. Outlet control riser structure completely destroyed. Likely offline storage. Overgrown with plants.	Medium	Separate inlet vs. outlet, could increase water quality volume by sloping area down to promote infiltration. Best option in neighborhood. Needs no dumping signs.
MGMT-30	Wagon Wheel Drive	11/17/2020	Bradley Mustain Leyna Tobey	Municipality	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Might be offline system for large storm events. Probable. Inlet also serves as the outlet.	Low	Put check valve on inlet/outlet structure but appears to have no large benefit.
MGMT-31	Wagon Wheel Drive	11/17/2020	Bradley Mustain Leyna Tobey	Municipality	Work Needed	Work Needed	Work Needed	Not Applicable	Work Needed	Not a Problem	Not Applicable	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Unmapped 30", 6", 4" inlet installed with no headwall in SW corner of basin. Possible illicit discharge, installation of unmapped pipes may have broken a sanitary sewer lateral. Water shot out over the top of a 30" pipe. It seemed like toilet flushing or sink running and then off. Erosion from runoff from adjacent properties and from roof drain or basement drain outlet into basin. Banks in unstable condition. Inlet and outlet structure are the same. Appears to be for offline storage.	High	Put check valve on inlet/outlet structure but appears to have no large benefit.
MGMT-32[1]	Orlando Street	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not Applicable	Not Applicable	Work Needed	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not a Problem	Not Applicable	BMP is a subsurface chamber system. Trees growing over the chamber and could be causing problems with the roots. Yard dumping on top of where storage tank is.	N/A	N/A
MGMT-33	Zachary Lane	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Work Needed	Work Needed	Not Applicable	Not a Problem	Not a Problem	Work Needed	Not Applicable	Monitor	Not a Problem	Work Needed	Not a Problem	Both inlets are slightly clogged with leaves. Outlet has large tree cause erosion problems. No grate on top of outlet. Outlet has a v notch. Woody vegetation on side slopes could cause problem in future. Lawn clippings dumped into basin.	Medium	Add trash rack on top of outlet structure. Could reestablish plantings. Put up no dumping sign.
MGMT-34	Cottonwood Lane	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Monitor	Monitor	Not a Problem	Not Applicable	Work Needed	Not a Problem	Monitor	Not Applicable	Not a Problem	Not a Problem	Monitor	Monitor	Riprap on side slopes. Inlet appears to be buried. Basin is filled with water (flowing very slowly). One large rodent hole observed in embankment. Outfall at end of basin flowing and right below emergency spillway. Outlet needs to be cleaned out. Rip rap appears to have caved in on inlet, but water is still getting out. Some erosion at inlet.	Medium	Reestablish wetlands plantings in places of standing water. Maintenance would be cleaning up leaves and general clean out. Add no dumping signs
MGMT-35	Moreau Place	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Monitor	Monitor	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Monitor	Woody vegetation on side slopes could be a problem later. Basin overgrown. Lead dumping near outlet of basin.	Medium	Put in outlet control structure increase wetland plantings rather than forest plantings. Does not appear to be receiving much flow.
MGMT-36	Keller Circle	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Grass dumping at sediment forebay. Could add plants to ponding areas.	Medium	Small drainage area. Add no dumping sign at gate.
MGMT-37[2]	Crest Ridge Lane	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Work Needed	Work Needed	Work Needed	Unknown	Unknown	Work Needed	Unknown	Unknown	Unknown	Work Needed	Work Needed	Unknown	Basin is inaccessible due to all of the fallen trees. Appears to have yard waste and debris dumping along with tree dumping. Unable to complete inspection. Could see what we believe to be an outlet control structure and emergency overflow. Pipe leaving structure appears to be 36+ inches. Overflow grate on top appears to be at least 4'x4'	Medium	Educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection

Detention Basin Assessment Summary

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MGMT-38	Walter Way	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Monitor	Monitor	Monitor	Not Applicable	Work Needed	Work Needed	Monitor	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Work Needed	Inlet partially buried and filled with sediment, no depression at inlet. Overgrowth at outlet. Large rodent hold through the base of the impoundment. Spillway and outlet are at the same elevation. Two trees in the basin, but they do not appear to be purposefully planted.	High	Maintenance could increase effectiveness, it appears to only have one CB and one street draining to it (low water quantity).
MGMT-39	Doloris Lane	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not Applicable	Monitor	Not a Problem	Gate is through a residents back yard. Inlet is not clogged, but has a lot of leaves at surrounding impoundment that need to be cleaned. Spillway over outlet, spillway doesn't have riprap.	Low	Implement proper outlet control structure. Looks like it services a small drainage area. Plenty of room for a sediment forebay. Could raise berm to increase capacity, but water quantity seems to be low.
MGMT-40	Coventry Lane	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Work Needed	Not a Problem	Work Needed	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Inlet and outlet are overgrown, erosion at inlet and outlet head wall.	Low	Increase capacity, put outlet control structure, raise elevation of spillway. Not sure how much water this basin gets, may not be worth it to retrofit if water quantity is low.
MGMT-41	Greenwood Street	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Monitor	Not Applicable	Not Applicable	Monitor	Not a Problem	Not Applicable	Not Applicable	Monitor	Not Applicable	Not a Problem	Not a Problem	Neighboring home cuts grass on basin and uses it as recreational area. Evidence of dumping at spillway. Inlet partially eroded and sides of flared end sections starting to cave in. Unmapped inlet next to mapped inlet in the SE corner. Side slopes have bare spots.	High	Could deeper basin, add plantings, bring up berm, add no dumping sign.
MGMT-42	Jennie Circle	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Monitor	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Tree/yard debris dumping at outlet area. Outlet pipe is a 8-12" PVC, plugged on the other end of the berm by leaves. Lots of wetland style vegetation. Erosion at inlet. Rip rap at outlet.	Medium	Add rip rap at inlet. Implement proper outlet control structure. Clear out end of outlet pipe on other side of berm. Add no dumping signs.
MGMT-43	Jennie Circle	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Monitor	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Work Needed	Not Applicable	Standing water at inlet. Small brook running through basin.	Low	Stream running through basin limits retrofit opportunity. Add plantings to prevent erosion, possibly sediment forebay at inlet.
MGMT-44	Barney Street	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Work Needed	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Not Applicable	Not a Problem	Monitor	Inlets are clogged with leaves and both have sediment build up. Southern inlet has yard drain catch basin connected. Center of basin has leaching cactbasin. CB is deep (~7').	High	Could put plantings down as energy dissipaters.
MGMT-45	Jade Lane	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Very little water quantity (resident came out and spoke to us). Spillway does not have rip rap.	Low	Small drainage area.
MGMT-46	Russo Circle	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Work Needed	Work Needed	Not a Problem	Not Applicable	Monitor	Not a Problem	Not Applicable	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Not a Problem	May be privately owned. Could not locate outlet structure. Company dumps asphalt millings in basin. Basin appears to be much larger than mapped (all wetland area). Outlet not accessible. Very overgrown with plantings. Embankment and side slopes appear to be slightly eroded and could be caving in in areas. Staged construction materials and equipment adjacent to banks. Most of inlet had standing water.	Medium	Could raise berms. Seems to be an already functioning wetland
MGMT-48	North West Street and Plumtree Way	11/17/2020	Bradley Mustain Leyna Tobey	Municipality	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Unmapped inlet coming in NE corner of basin. Cannot find structure sending water here. Possibly 90 degree bend in roadway. Catch basins located directly next to inlet pipes.	Low	Put outlet structures in, possibly second berm in the middle. Possible chamber system from catch basins. Invested homeowner. Placed granite block to cover view of inlet.
MGMT-49	Shoemaker Lane	11/17/2020	Bradley Mustain Leyna Tobey	Municipality	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Work Needed	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Inlet on NE end has a tree growing through it and weeds. Outlet is not structure, just a protruding pipe, there is potential for improvement. Vegetation looks good. SE tip could be gravel wetlands. Seed area next to new parking lot to prevent sediment runoff into basin.	Low	Build a berm on the SE and southern boundary of the impoundment. Modify/install outlet control structure. Could get approximately 1-2 additional feet of storage capacity.
MGMT-50	Hemlock Ridge	11/17/2020	Bradley Mustain Leyna Tobey	Municipality	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Monitor	Not a Problem	Monitor	Not Applicable	Not a Problem	Not a Problem	Monitor	Not a Problem	No easy way for truck access. Outlet pipe area is overgrown. Looks like high velocities exiting inlet pipe with potential for erosion, could be pressure flow instead of gravity flow if there are flooding concerns. Check resident database to see if there are issues nearby. Could be also from steep slope in inlet pipe.	Low	Bring up berm on east side for more volume, more plantings, install better riser structure for WQV with trash rack.

Detention Basin Assessment Summary

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MGMT-51	Bowles Road	11/17/2020	Bradley Mustain Leyna Tobey	Municipality	Not a Problem	Not a Problem	Monitor	Not a Problem	Work Needed	Not a Problem	Work Needed	Not a Problem	Monitor	Not a Problem	Work Needed	Not a Problem	Inlet to basin not in good condition. Could use more vegetation around impoundment. No maintenance performed recently on outlet. No maintenance access without going through woods and over fence. Didn't see outfall so we think it's infiltration. If there was an outfall, maybe wet detention.	Low	Could increase capacity of pond/volume going to the pond and increase plantings for pre-treatment. Could give downstream area relief.
MGMT-52	Woodside Drive	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Monitor	Not Applicable	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Outlet structure has erosion on side slope and could use a trash rack. Construction site next to basin has no erosion control and has resulted in a lot of sediment accumulation in the basin. Sediment will greatly hinder basin's ability to infiltrate water. Inlet has rip rap level spreader.	Medium	Small contributing drainage area, and basin is large enough already with the outlet control structure. Basin appears to be functioning as intended.
MGMT-53	Paul Revere Drive	11/18/2020	Leyna Tobey Tyler Feeney	Private	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Private basin, no inspection completed.	N/A	N/A
MGMT-54	Stevenson Lane	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Not a Problem	Monitor	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Basin impoundment has old fence, dumping, sand, signs of a fire pit in the center. Leaves accumulating near inlet.	Medium	Basin appears to be functioning as intended. Outlets and spillways are raised.
MGMT-55	Westview Lane	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Monitor	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Some erosion in between inlet and level spreader. Headwall on outlet coming from outlet control structure is covered by leaves.	Low	Already built out well. Could put trash rack on upper orifice on outlet control structure. Large basin, could route more water here.
MGMT-56	Burlington Drive	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Monitor	Not a Problem	Not Applicable	Work Needed	Work Needed	Monitor	Not a Problem	Not a Problem	Work Needed	Not a Problem	Work Needed	Basin has been turned into a racetrack. Inlet in severely overgrown. Inlet has a riprap level spreader. Large rodent holes throughout basins. Motor cross tracks all across basin, residents also imported sand to make tracks. Outlet has overgrowth that is clogging the trash rack.	Medium	Reestablish basin would be top priority including removal of sand, reestablishing plantings and vegetation, and clearing overgrowth at inlet and outlet
MGMT-57	Moylan Lane	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not a Problem	Monitor	Monitor	Monitor	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Appears to receive drainage from industrial / business buildings (roof drains). Sediment forebay is overgrown and unmapped. Frozen standing water in impoundment.	Low	Deepen basin. No real opportunity for plantings in infiltration basin because of basin placement near office building. There appears to be other BMPs in this industrial park.
MGMT-58	Behind Agawam Fire Station 2	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Monitor	Monitor	Not Applicable	Not Applicable	Work Needed	Not a Problem	Monitor	Not a Problem	Monitor	Not a Problem	Not a Problem	Monitor	Could be privately owned. Inlet pipe buried, outlet control structure partially buried with leaves, scattered rebar and plastic piping (from business next door), trees in basin have been cut, loose construction material staging on other side of spillway, basin borders stockpiles of mulch West of basin. Unable to locate outlet pipe in Northwest corner.	Medium	Raise outlet structure, reestablish plantings (and stop dumping from company next door), general cleanup for water quality
MGMT-59	Lango Lane	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not Applicable	Not Applicable	Monitor	Not a Problem	Not Applicable	Not Applicable	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Gate locked, could not walk inside impoundment, appears to be erosion at inlet, could not locate outlet or spillway. High pressure gas main on west side of basin. Need to clear brush for construction access.	Low	Outlet control structure, route a ton more drainage here (capacity is way larger than what it is taking), establish plantings
MGMT-60	Robin Ridge Drive	11/17/2020	Bradley Mustain Leyna Tobey	Municipality	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Work Needed	Not a Problem	Not a Problem	Not a Problem	Monitor	Not a Problem	Monitor	Not a Problem	Spillway overgrown, potential for bigger issues down the road. Path leading to basin but no direct path to outlet structure. Cannot get truck to basin, only 4 wheeler. Inlet blocked at end of pipe by sediment. Sediment buildup at inlet pipe is restricting flow to the basin.	High	Seems to be room for pretreatment. Could fill in v-notch on outlet structure by a few inches to increase storage capacity slightly.
MGMT-61	Farmington Circle and Valley Brook Road	11/17/2020	Bradley Mustain Leyna Tobey	Municipality	Monitor	Not a Problem	Not Applicable	Not Applicable	Monitor	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Some evidence of erosion on the embankment, could use more rock at inlet. Could install forebay at outlet of inlet pipe. Looks like water comes out of inlet too quickly and could use some energy dissipation. Home owners just put in new fencing. Spillway in at top of outlet control structure.	High	Could install sediment forebay. Not much bang for buck. Good potential but wrong setting.

Detention Basin Assessment Summary

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MGMT-62	Michele Lane	11/18/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Monitor	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Work Needed	Basin is larger than mapped. There is another inlet on Southeastern side that feeds to basin and outlet structure is unmapped on the Southwestern corner. All inlets have some clogging and growth. Emergency spillway on top of outlet control structure. Large rodent holes in south side sideslope	Low	Lots of capacity, could take a lot more stormwater. Expand plunge pool to turn it into sediment forebay, deepen infiltration in forebay to promote infiltration. Possibly add vegetation to forebay.
MGMT-63	Connors Cove	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Not a Problem	Monitor	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Not a Problem	Not a Problem	Not a Problem	Slight sediment build up in between enclosed riprap and inlet, leaching CB in middle of basin. Enclosed riprap for energy dissipation. Some bare spots on side slopes.	Low	Outlet structure is already really high, basin seems to be functioning well.
MGMT-64	Connors Cove	11/19/2020	Leyna Tobey Tyler Feeney	Municipality	Work Needed	Not a Problem	Monitor	Not a Problem	Work Needed	Not a Problem	Not a Problem	Not Applicable	Not a Problem	Monitor	Work Needed	Not a Problem	Overgrown. Lots of trees growing in basin. Caged rip rap for energy dissipation at inlet. Yard waste dumping next to fence. Fence is partially collapsed in NE corner. Inlet is clogged and overgrown. Embankment of south end of basement sloping to brook is unstable.	Medium	Small drainage area, already has important components. Add no dumping sign. Maintenance is most important.

Table Notes:
1. BMP at this location is not a detention basin.
2. Detention basin was inaccessible during inspections.

General Notes:
1. The last precipitation event prior to detention basin inspections occurred on November 16, 2020 and was approximately 1.1-inch in depth.
2. N/A = Not Applicable.

Detention Basin Rehabilitation
Priority Project Summary

Basin ID	Ownership	Street Name	Comments & Observations	Prioritization	Basin Rehabilitation Priority
MGMT-3	Municipal	Blaire's Hill Road	Basin is completely overgrown.	17	Low
MGMT-5	Municipal	Logan Place	Basin is completely overgrown; side slopes are eroding and are partially collapsed in some locations.	6	High
MGMT-6	Municipal	Silver Lake Drive	Basin is completely overgrown.	20	Low
MGMT-7	Municipal	Royal Lane	Basin is completely overgrown.	30	Low
MGMT-11	Municipal	Pembroke Lane	Basin is completely overgrown.	18	Low
MGMT-12	Municipal	Richardson Place	Basin is completely overgrown; tree growing through outlet structure.	8	Medium
MGMT-13	Municipal	Cynthia Place	Basin is completely overgrown; catch basin immediately upstream of the basin has settled and is in poor condition.	28	Low
MGMT-14	Municipal	Middle Lane	Tree growing through inlet pipe; rodent holes in side slopes; embankment surrounding outlet is eroding.	5	High
MGMT-15	Municipal	Marla Place	Basin is completely overgrown; emergency spillway and embankment surrounding outlet pipe are eroding; flared end section of outlet pipe is disconnected; erosion observed along the base of the impoundment area.	3	High
MGMT-17	Municipal	Tobacco Farm Road	Basin is completely overgrown.	16	Low
MGMT-18	Municipal	Tobacco Farm Road	Basin is completely overgrown.	23	Low
MGMT-21	Municipal	Memory Lane	Basin is completely overgrown; stormwater observed flowing and discharging from beneath the basin's outlet pipe.	11	Medium
MGMT-24	Municipal	Cedar Knoll Drive	Basin is completely overgrown.	15	Low
MGMT-26	Municipal	Roosevelt Avenue	Basin is completely overgrown; outlet pipe damaged.	12	Medium
MGMT-27	Municipal	Avalon Place	Basin is completely overgrown; tree growing through inlet pipe.	9	Medium
MGMT-28	Municipal	Princeton Avenue	Basin is completely overgrown; significant erosion downstream of inlet headwall; erosion caused by small stream running through basin; erosion caused by driveway runoff traveling via overland flow to basin; outlet pipe buried.	4	High
MGMT-29	Municipal	Wagon Wheel Drive	Basin is completely overgrown; outlet control structure significantly damaged.	10	Medium
MGMT-30	Municipal	Wagon Wheel Drive	Basin is completely overgrown.	25	Low

Detention Basin Rehabilitation
Priority Project Summary

Basin ID	Ownership	Street Name	Comments & Observations	Prioritization	Basin Rehabilitation Priority
MGMT-31	Municipal	Wagon Wheel Drive	Embankments are eroded and appear to be in unstable condition; unmapped 30-inch, 6-inch, and 4-inch inlets with no headwall in the southwest corner of the basin; possible illicit discharge entering the basin through the southwest inlets.	2	High
MGMT-33	Municipal	Zachary Lane	Basin is completely overgrown.	22	Low
MGMT-34	Municipal	Cottonwood Lane	Basin is completely overgrown.	21	Low
MGMT-35	Municipal	Moreau Place	Basin is completely overgrown.	26	Low
MGMT-37	Municipal	Crest Ridge Lane	Basin is completely overgrown; could not access basin; basin surrounded by steep embankments.	14	Medium
MGMT-38	Municipal	Walter Way	Basin is completely overgrown.	29	Low
MGMT-43	Municipal	Jennie Circle	Basin is completely overgrown.	24	Low
MGMT-46	Municipal	Russo Circle	Basin is completely overgrown with wetlands plantings and some woody vegetation; embankments and side slopes appear to be slightly eroded; construction materials owned by nearby businesses are staged around the perimeter of the basin; asphalt millings dumped into the basin.	13	Medium
MGMT-49	Municipal	Shoemaker Lane	Tree growing through northeast inlet pipe; bare soil adjacent to basin likely causing sedimentation in the basin.	7	Medium
MGMT-56	Municipal	Burlington Drive	Landowners abutting the basin have imported sand into the basin to create a dirt bike track; large rodent holes observed throughout the basin'simpoundment and embankments; the locations of the inlet pipe and outlet control structure are completely overgrown.	1	High
MGMT-60	Municipal	Robin Ridge Drive	Basin is completely overgrown.	19	Low
MGMT-64	Municipal	Connors Cove	Basin is completely overgrown.	27	Low

Detention Basin High and Medium Retrofit Potential
Priority Project Summary

Basin ID	Ownership	Street Name(s)	Comments & Observations	Prioritization	Basin Retrofit Priority
MGMT-2	Municipal	Windermere Drive	Potential to: install a sediment forebay to address sediment buildup observed during inspection.	13	High
MGMT-4	Municipal	Lancaster Drive	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection.	28	Medium
MGMT-5	Municipal	Logan Place	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection.	31	Medium
MGMT-6	Municipal	Silver Lake Drive	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection. In close proximity to Silver Lake.	14	Medium
MGMT-7	Municipal	Royal Lane	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection; install a sediment forebay to address sediment buildup observed during inspection.	11	High
MGMT-10	Municipal	Oakmont Place	Potential to: install a sediment forebay to address sediment buildup and erosion observed during inspection; increase basin storage capacity by widening or deepening basin or installing an outlet control structure; increase basin plantings to filter and settle out pollutants. In close proximity to flood plain (1% annual chance of flooding, with BFE).	2	High
MGMT-12	Municipal	Richardson Place	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection. In close proximity to Tarkill Brook.	19	Medium
MGMT-14	Municipal	Middle Lane	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection.	25	Medium
MGMT-15	Municipal	Marla Place	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection.	30	Medium

Detention Basin High and Medium Retrofit Potential
Priority Project Summary

Basin ID	Ownership	Street Name(s)	Comments & Observations	Prioritization	Basin Retrofit Priority
MGMT-19	Municipal	Katy Lane	Potential to: install a riprap apron or sediment forebay at the location of the basin's inlet to address erosion observed during inspection; increase basin storage capacity by installing an outlet control structure; increase basin plantings to filter and settle out pollutants. In close proximity to stream.	7	High
MGMT-20	Municipal	Nolan Land	Potential to: install a sediment forebay to address sediment buildup and erosion observed during inspection; install a riprap apron at the basin's outlet. In close proximity to Robinson State Park and White Brook.	4	High
MGMT-22	Municipal	Alice Lane	Potential to: install a sediment forebay to address sediment buildup observed during inspection; shorten the basin's inlet pipe to increase the flow path between the inlet and outlet control structure.	9	High
MGMT-24	Municipal	Cedar Knoll Drive	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection.	23	Medium
MGMT-26	Municipal	Roosevelt Avenue	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection; increase basin storage capacity by installing an outlet control structure; increase basin plantings to filter and settle out pollutants. In close proximity to wetlands.	3	High
MGMT-27	Municipal	Avalon Place	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection. In close proximity to Robinson State Park and Miller Brook.	18	Medium
MGMT-29	Municipal	Wagon Wheel Drive	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection.	33	Medium
MGMT-31	Municipal	Wagon Wheel Drive	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the potential illicit discharge observed during inspection; install a headwall is the southwestern corner of the basin to stabilize the basin's embankment.	10	High
MGMT-33	Municipal	Zachary Lane	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection. In close proximity to Tarkill Brook.	16	Medium

Detention Basin High and Medium Retrofit Potential
Priority Project Summary

Basin ID	Ownership	Street Name(s)	Comments & Observations	Prioritization	Basin Retrofit Priority
MGMT-34	Municipal	Cottonwood Lane	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection. In close proximity to Threemile Brook and flood plain (1% annual chance of flooding, with BFE).	15	Medium
MGMT-35	Municipal	Moreau Place	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection.	32	Medium
MGMT-36	Municipal	Keller Circle	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection.	27	Medium
MGMT-37	Municipal	Crest Ridge Lane	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection. In close proximity to flood plain (1% annual chance of flooding, with BFE).	17	Medium
MGMT-38	Municipal	Walter Way	Potential to: install a sediment forebay to address sediment buildup observed during inspection. In close proximity to Threemile Brook and flood plain (1% annual chance of flooding, with BFE).	6	High
MGMT-41	Municipal	Greenwood Street	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection; increase basin storage capacity by deepening basin or raising embankment elevations; increase basin plantings to filter and settle out pollutants. Located within flood plain (1% annual chance of flooding, with BFE).	1	High
MGMT-42	Municipal	Jennie Circle	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection.	24	Medium
MGMT-44	Municipal	Barney Street	Potential to: install a sediment forebay to address sediment buildup and erosion observed during inspection. In close proximity to the Connecticut River.	8	High
MGMT-46	Municipal	Russo Circle	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the construction material dumping and staging observed during inspection.	29	Medium

Detention Basin High and Medium Retrofit Potential
Priority Project Summary

Basin ID	Ownership	Street Name(s)	Comments & Observations	Prioritization	Basin Retrofit Priority
MGMT-52	Municipal	Woodside Drive	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection. In close proximity to wetlands.	21	Medium
MGMT-54	Municipal	Stevenson Lane	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection.	34	Medium
MGMT-56	Municipal	Burlington Drive	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection.	26	Medium
MGMT-58	Municipal	Behind Agawam Fire Station 2	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping and construction material staging observed during inspection.	22	Medium
MGMT-60	Municipal	Robin Ridge Drive	Potential to: install a sediment forebay to address sediment buildup observed during inspection; increase storage capacity by modifying outlet control structure. In close proximity to Robinson State Park.	5	High
MGMT-61	Municipal	Farmington Circle and Valley Brook Road	Potential to: install a riprap apron or sediment forebay at the location of the basin's inlet to address erosion observed during inspection.	12	High
MGMT-64	Municipal	Connors Cove	Potential to: educate the public on the negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste dumping observed during inspection. In close proximity to Washington Brook.	20	Medium

APPENDIX E: IMPERVIOUS AREA MITIGATION STRATEGY REPORT

IMPERVIOUS AREA MITIGATION STRATEGIES

Agawam Stormwater Master Plan

40 Shattuck Road | Suite 110
Andover, Massachusetts 01810
800.426.4262

woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

0233182.00
Town of Agawam, Massachusetts
May 2021

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Appendix A: Walnut Street Extension Conceptual Plan

1. INTRODUCTION

The purpose of this report is to identify feasible impervious area (IA) mitigation and implementation strategies that the Town of Agawam, Massachusetts (Town) can integrate with its stormwater management program and public and private development and redevelopment projects over time. Impervious areas, also referred to as impervious cover or surfaces, indicate features and structures that water cannot penetrate, such as rooftops, roadways, driveways, sidewalks, parking lots, and highly compacted soils. Impervious areas prevent precipitation and stormwater from infiltrating into soils and the ground surface, resulting in increased stormwater runoff and reduced groundwater recharge.

The strategies outlined herein are intended to help the Town advance its goals of protecting their water resources, implementing sustainable and resilient practices in the face of climate change, and maintaining the safety and wellbeing of Agawam's residents and visitors, alike.

1.1 Impervious Areas in Agawam

Agawam has approximately 2,480 acres of Town-, State- and privately-owned impervious areas, accounting for roughly 17-percent of the land cover within the Town. A breakdown of impervious areas by property type is provided in **Table 1** below and impervious areas Town-wide are illustrated on **Figure 1**.

Table 1: Impervious Area by Property Type

Property Type	IA (Acres)	% Town-wide
Residential	981	40%
Commercial	497	20%
Private (Other)	131	5%
Town Facilities	73	3%
State Facilities	25	1%
Federal	3	0.1%
Total Roads	769	31%
*Town Roads**	647	26%
MassDOT Roads	98	4%
State Park or Forest Roads	16	0.6%
Undetermined Roads	8	0.3%
Total	**2,478**	**100%**

Note: *Includes accepted and unaccepted roads.

The above data can be used to inform the implementation of impervious area mitigation strategies based on the Town's jurisdiction and opportunities through redevelopment. The following data observations are relevant to the strategies discussed in this report:

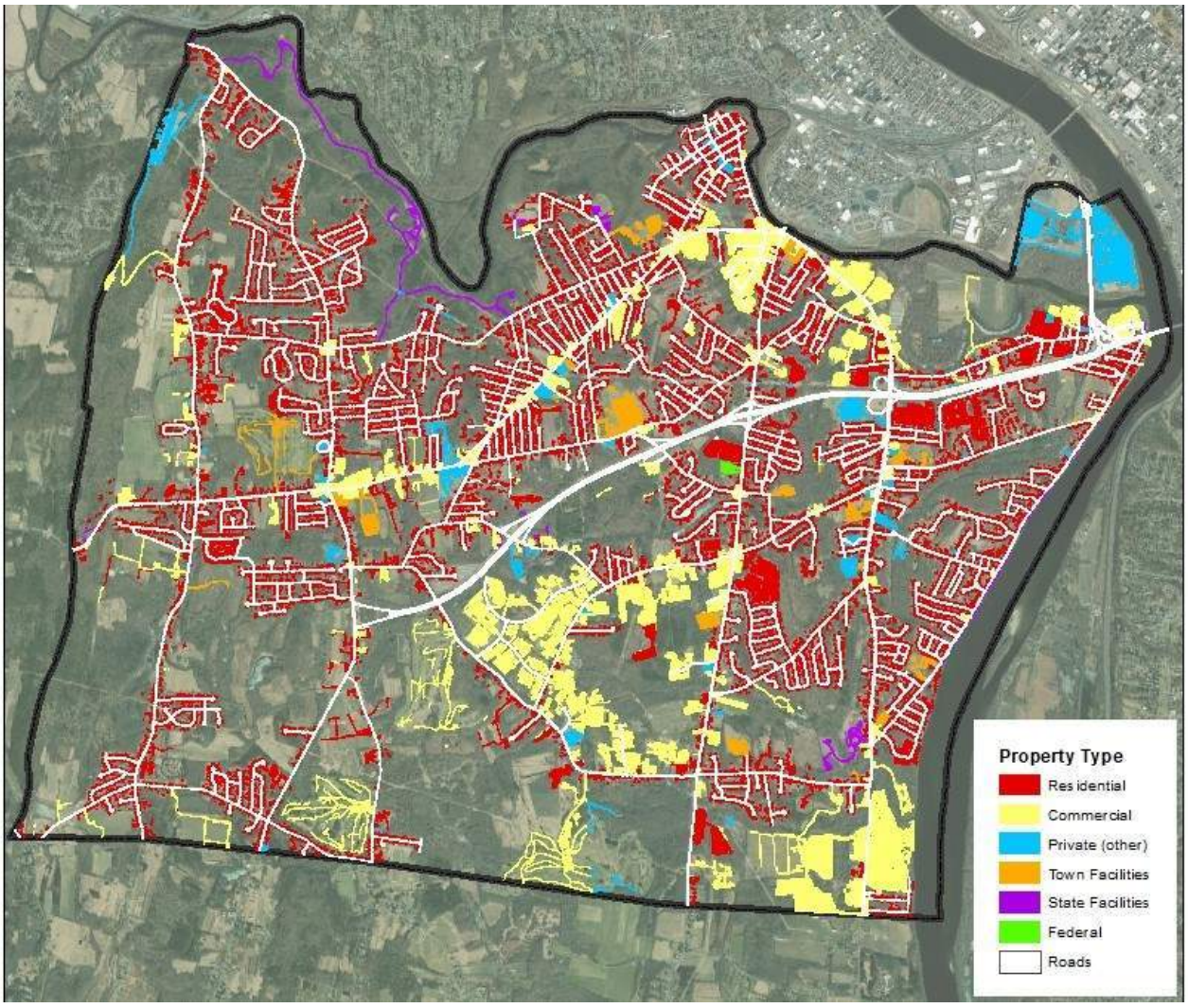
1. Residential properties represent 40% of the total impervious areas in Town. These properties can be challenging to manage on a site-by-site basis due to the small amount of IA per parcel and lack of regulatory requirements for redevelopment and stormwater management. IA mitigation strategies often have a low

benefit to cost ratio, but strategies for impervious area management at the neighborhood scale can be very beneficial, especially when combined with road improvement projects.

2. Roads represent 31% of impervious areas in Agawam and the majority are Town roads. Roads can represent the greatest opportunity to reduce or manage impervious areas that are within the Town's control. Traffic and road design standards, as well as right-of-way (ROW) limitations, however, can restrict the Town's ability to implement impervious area mitigation strategies.

3. Commercial and private properties represent 25% of the total impervious areas in Town and have significant potential for implementation of mitigation strategies through redevelopment activities at parcels with large impervious areas. This potential can increase when combined with Town projects for road improvements, for example.

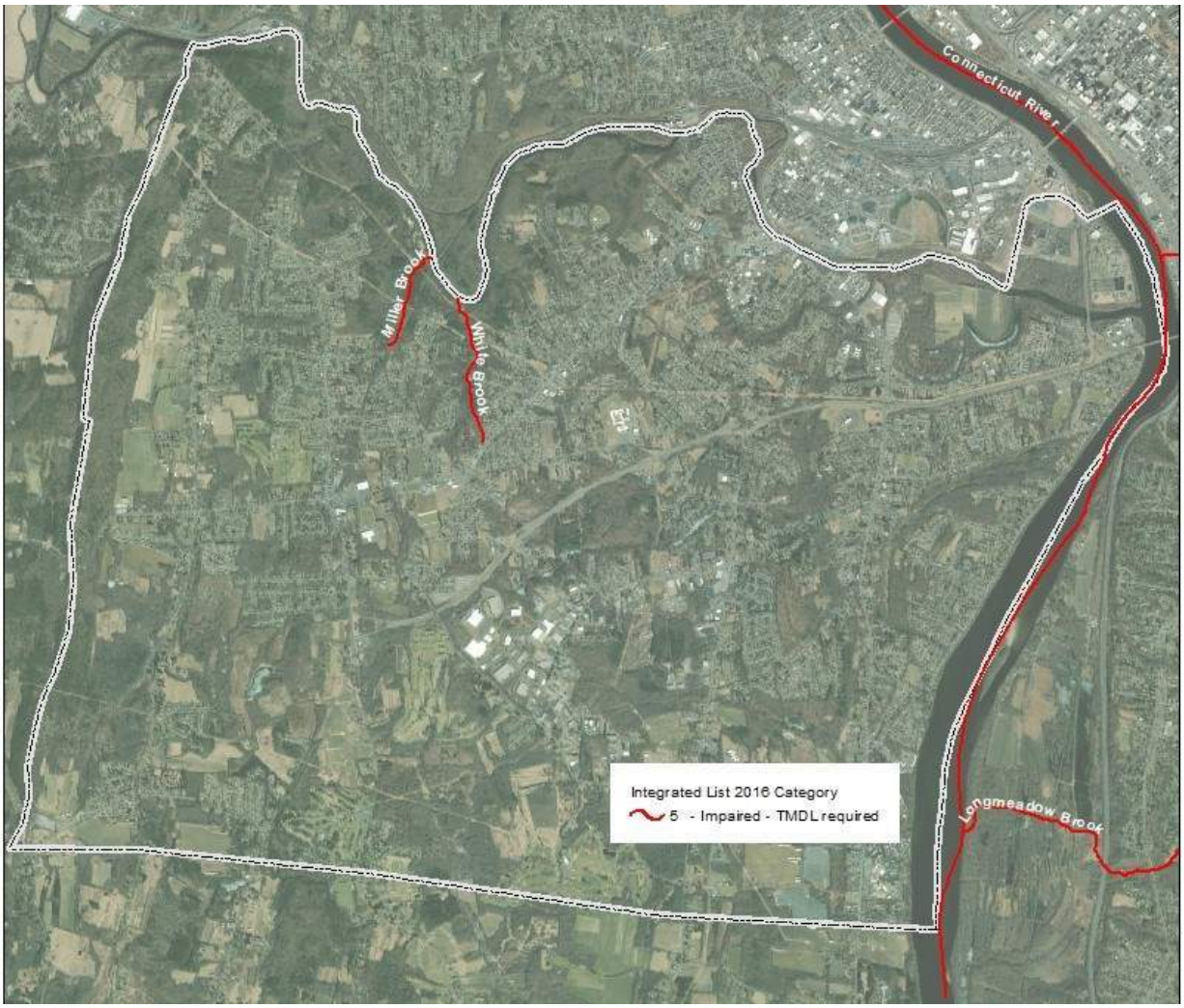
Figure 1: Impervious Areas in Agawam



1.2 Stormwater Impacts

When stormwater flows across impervious areas, it can transport pollutants, including oils, greases, nutrients, pesticides, fertilizers, organic matter, bacteria, and other contaminants, into stormwater conveyance systems, and ultimately into receiving waterbodies. Agawam's receiving waterbodies consist of several ponds, streams, brooks, and the Westfield and Connecticut Rivers. The Massachusetts 2016 Integrated List of Waters categorized the Connecticut River as a Category 5 waterbody, listing E. coli and polychlorinated biphenyls (PCBs) in fish tissue impairments that require Total Maximum Daily Loads (TMDLs). Miller Brook and White Brook are also listed as Category 5 waterbodies due to E. coli. These waters within the Town of Agawam are shown on **Figure 2** and impervious areas have an impact on water quality, as well as pollutant sources in the watersheds.

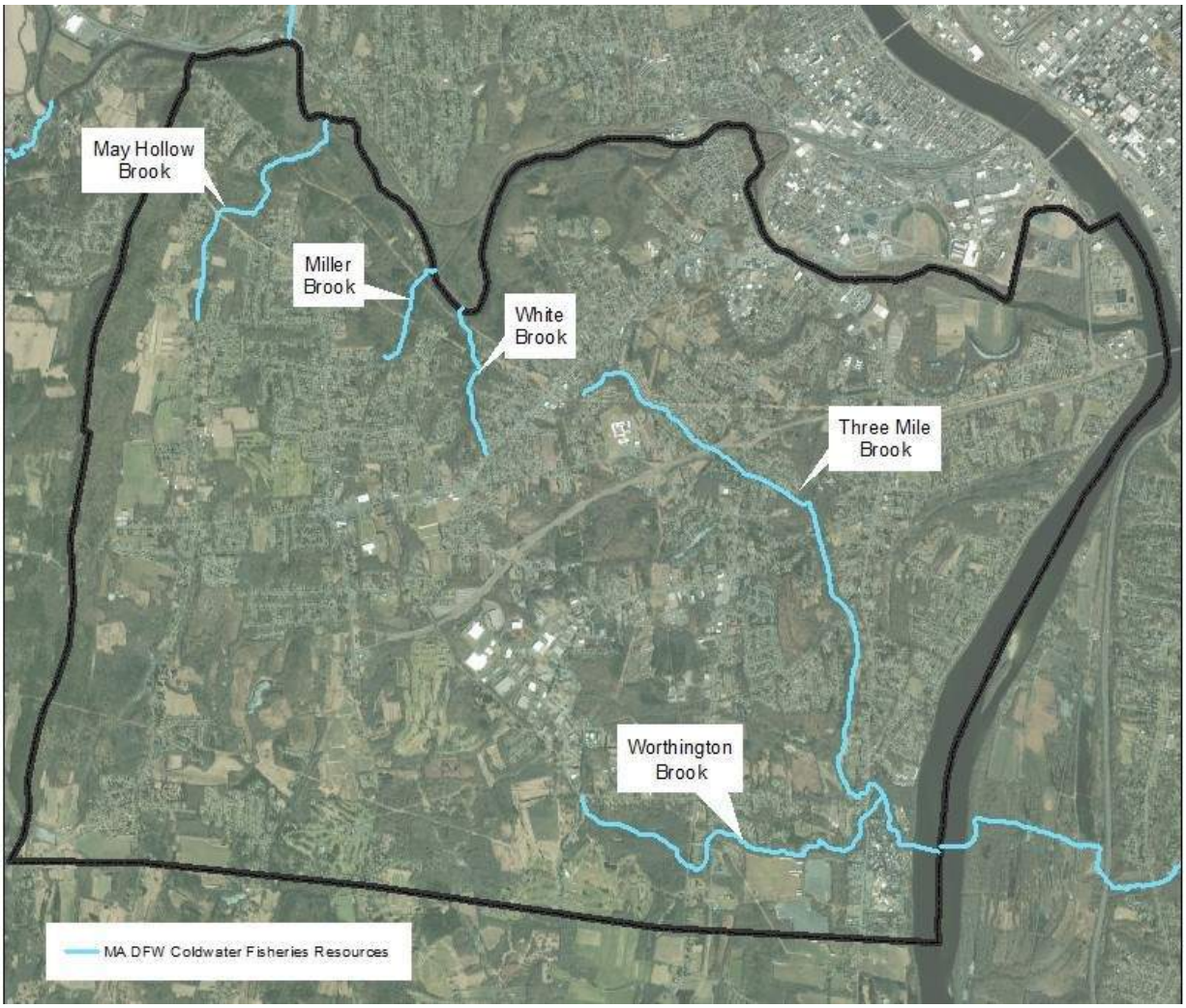
Figure 2: Water Quality Status for Waterbodies in Agawam



Impervious areas are also a key factor that increases the "flashiness" of drainage areas and the risk of flooding during certain storm events. This is particularly apparent during intense precipitation events that result in street flooding at numerous locations in Agawam. The Town does not currently experience large stream or river flood events that impact properties; however, impervious areas increase the volume and intensity of stream flows that result in stream bank erosion and habitat degradation.

Additionally, impervious areas reduce infiltration and groundwater contributions to streams, resulting in decreased stream base flow, especially during the summer months. Impervious areas also increase the temperature of stormwater runoff that occurs during the summer months when aquatic life is most vulnerable to thermal impacts. Agawam has approximately 10.2 miles of mapped Coldwater Fish Resources (CFR) according to the Massachusetts Division of Fisheries and Wildlife and impervious areas have a direct impact on these resources. **Figure 3** shows the mapped CFR streams and impervious areas in Agawam to illustrate the importance of mitigating impervious area impacts to provide habitat protection.

Figure 3: Coldwater Fish Resources and Impervious Surfaces in Agawam



1.3 Tree Canopy and Heat Island Effect

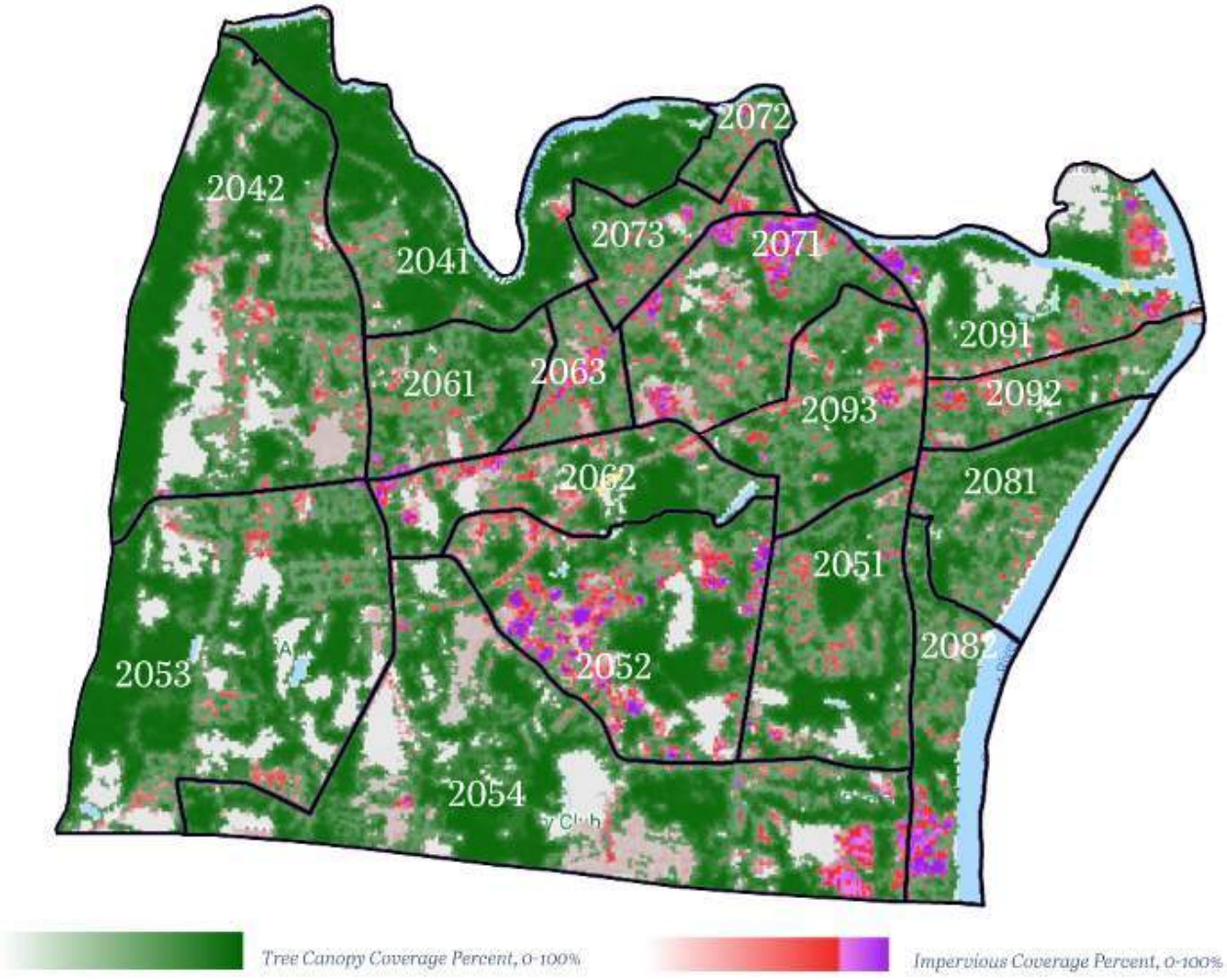
Impervious areas in the Town of Agawam contribute to the heat island effect, which occurs when largely impervious areas experience significantly warmer temperatures than outlying areas. Impervious structures such as buildings, roads, and other infrastructure absorb and re-emit the sun's heat more than natural, vegetated landscapes and waterbodies. Urban areas, where impervious structures are highly concentrated and vegetation is limited, become "islands" of higher temperatures relative to outlying areas. Heat islands contribute to higher daytime temperatures, reduced nighttime cooling, and higher air-pollution levels. These, in turn, contribute to heat-related deaths and heat-

related illnesses such as general discomfort, respiratory difficulties, heat cramps, heat exhaustion, and non-fatal heat stroke.

In 2020, the Pioneer Valley Planning Commission (PVPC) conducted a preliminary urban tree canopy cover assessment for the Town of Agawam using aerial imagery to investigate existing tree cover across the Town's neighborhoods. The study found that tree canopy cover varies throughout the Town, but with some trends that are consistent with development characteristics. Generally, the Town's commercial and industrial centers and areas with the Town's highest rates of poverty and minority residents tend to have less tree canopy cover, making these areas more vulnerable to heat island effects.

The largest concentrations of impervious area in Agawam are located in the central portion of the Town which contains several commercial and industrial facilities (Census Block Group 2052), in the northern portion of the Town along the Westfield River (Census Block Group 2071), and in the southeastern portion of the Town along the Connecticut River (Census Block Group 2082), as shown in **Figure 4** below:

Figure 4: Agawam Tree Canopy and Impervious Area Analysis



Source: Pioneer Valley Planning Commission

These three areas, Census Block Groups 2052, 2071, and 2082, have contained some of the highest concentrations of impervious areas in Agawam throughout the Town's developed history and should be a higher priority to implement IA mitigation techniques.

1.4 Development, Redevelopment, and Stormwater Design Standards

In general, the design of new developments in the early- to mid-1900s typically consisted of large buildings and oversized paved lots with stormwater management systems that quickly conveyed flows to receiving waters and little or no consideration to reduce flows or address water quality impacts. In the late 1900s and early 2000s, following the enactment of the Clean Water Act in 1972, a new focus was placed on restoring and maintaining water quality in the United States. The connection was made between impervious areas and increased runoff volumes, increased peak rates of discharge, increased rates of pollutant transport in stormwater runoff, and decreased groundwater recharge volumes. State and local governments began instituting stormwater design standards applicable to new development and redevelopment projects, which typically have a focus of mitigating the impacts of new impervious areas.

Many redevelopment standards, including those in the Massachusetts Stormwater Handbook, do not provide substantial guidelines or strategies for mitigating the effects of existing impervious areas. These standards, however, do outline criteria to improve stormwater management through redevelopment and encourage the use of Low Impact Development (LID) techniques. LID techniques are also referred to as "Environmentally Sensitive Site Design" or "Green Infrastructure (GI)" and refers to systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration or use of stormwater to protect water quality and associated aquatic habitat. LID/GI are an approach to land development and re-development that works with nature to manage stormwater as close to its source as possible, preserve or recreate natural landscape features, minimize impervious area impacts, and create functional and appealing site drainage.

The impervious area mitigation strategies in this report represent LID/GI techniques that the Town can implement through stormwater design standards. Most new development and redevelopment activities are subject to these stormwater design standards; however, many activities are not regulated in the same manner, but there are significant opportunities to reduce impervious area impacts following the guidelines in this report.

2. IMPERVIOUS AREA MITIGATION STRATEGIES

There are various strategies that have been developed to mitigate the effects of impervious areas on surrounding environments. The three main strategies for impervious area mitigation include impervious area removal, impervious area disconnection, and, in situations where removal and disconnection are infeasible, impervious area impact reduction. This section discusses some of the most widely used strategies for these mitigation themes.

2.1 Impervious Area Removal

Impervious area removal consists of removing unused or excess impervious surfaces and either replacing them with pervious surfaces or converting them to open spaces. Roadways, driveways, parking lots, walkways, and patios are examples of impervious surfaces that can be converted into pervious areas or downsized, increasing the ability for stormwater to infiltrate and increasing groundwater recharge. Grass, landscaped areas, gardens, porous pavement, and other alternatives can be used to replace removed impervious surfaces and maintain a similar function.

Public roadways can often provide significant opportunities to reduce impervious areas as part of road reconstruction projects. In many communities, roads were constructed according to old design and subdivisions standards that required larger widths than current standards and construction of sidewalks on each side when one sidewalk may be adequate based on current use. Additionally, some intersections and cul-de-sacs may have unnecessary pavement that could be removed without impacting traffic or turning radii. **Figure 5** shows an example of a paved cul-de-sac at Zachary Lane and a cul-de-sac with an interior pervious area at Richardson Place in Agawam. It is also worth noting that there is only one sidewalk along Richardson Place versus sidewalks on both sides of Zachary Lane. In low-traffic, residential areas, crosswalks are not needed, and one sidewalk is typically adequate.

Figure 5: Example of Reduced Impervious Area at a Cul-de-sac



Reduction of impervious areas by reducing pavement width, for example, along existing roadways requires more detailed analysis for traffic and safety considerations. Reduction of impervious areas at Cul-de-sacs, however, is easier to identify and represent relatively simple opportunities within the public ROW that can be completed as part of road paving activities. **Table 2** lists 47 cul-de-sacs in Town have the potential for impervious area reduction based on a preliminary desktop review of streets in Town and cul-de-sacs that do not have an interior pervious area.

Table 2: Cul-de-sacs with Potential for Impervious Area Reduction

Brien Street	Jennie Circle	Pheasant Run Court
Bunker Hill Road	Jessica Place	Red Fox Drive
Calico Lane	Katharine Drive	Red Oaks Circle
Cambridge Street near Granger Drive	Keller Circle	Richardson Place
Cecile Street	Kristen Lane	Russo Circle
Clover Hill Drive	Lakeview Circle	Shoemaker Lane west of Rt 187
Debra Lane	Liquori Drive	Sharon Lane
Denise Lane	Losito Lane	Spruce Circle
Depalma Street	Marla Place	Stony Hill Road
Doloris Lane	Marlene Drive (2 cul-de-sacs)	Tracy Drive
E View Drive	Meadowbrook Road	Unnamed NE of Plum Tree Way along North West Street
Edgewater Road	Moylan Lane	Vassar Road (both ends)
Family Lane	Oak Lane	Walter Way
Faymore Drive	Oakridge Drive	Woodcock Court
Gary Place	Partridge Land	Zachary Lane
Jade Lane	Peros Drive	

Figure 6 illustrates an example of impervious area removal for a residential parking space.

Figure 6: Example of Residential Impervious Area Removal



Source: Department of Energy and Environment Riversmart

Implementation:

- Educate landowners and developers on the benefits of impervious area removal and address any concerns from implementing a porous system. Provide examples of ways to remove impervious areas, such as eliminating a parking space and installing a grass island in its place or replacing an asphalt driveway with porous pavement.
- Partner with local companies that specialize in porous pavement and other low impact development techniques. Provide their contact information to landowners and developers to facilitate impervious area removal and implementation of mitigation techniques.
- Find ways to incentivize landowners and developers to remove unused or excess impervious areas.
- Consider revising local regulations to:
    - Reduce requirements for roadway widths, driveway lengths and widths, and parking stall lengths and widths where feasible and appropriate.

- Reduce parking space quantity requirements for facilities within a certain distance of public transit stops.
- Promote additional bus stops to large shopping centers to reduce the need for parking.
- Consider instituting a maximum parking standard for certain property types and requirements to provide a certain percentage of spaces on pervious materials when overflow parking is needed.
- Increase requirements for percentages of compact car and motorcycle parking spaces.
- Encourage the construction of walking paths, sidewalks, and bike racks to allow for alternate means of transportation to facilities.

- Perform parking assessments at existing commercial and industrial facilities with large parking lots. Examine these areas throughout the year to gather information regarding the average and maximum percentages of used parking spaces. This information can be used to form conclusions on whether excess impervious area exists within each lot and whether the removal of parking spaces and associated impervious area is a feasible solution for the facilities.

Limitations:

- Depending on the total area of impervious area removal or replacement proposed, implementation of this strategy can be costly for landowners and developers. In communities that have a stormwater utility fee that charge properties based on impervious area, it may make economic sense to remove impervious area, especially when considering repaving or rehabilitation of pavement.
- Impervious area removal is more effective in areas with well-draining native soils (sands and gravels) than in areas with poorly-draining soils (silts and clays).
- Local regulations may contain minimum roadway width, driveway width, and parking space requirements that could restrict the ability to remove impervious areas but can be revised to incorporate this strategy.
- Subsurface soils located beneath removed impervious areas may be compacted. In these cases, soil restoration, as discussed in Section 2.1.2, may be necessary to promote effective stormwater infiltration.

2.1.1 Porous Pavement

Porous pavement, also known as permeable pavement, is a type of pavement designed with materials that have a higher percentage of air voids than standard paving materials. The increased void space in porous pavement provides storage for stormwater runoff and allows stormwater to flow downward, through the voids, and infiltrate into subsurface soils. As a result, porous pavement can increase groundwater recharge and reduce stormwater runoff volumes, peak rates of discharge, and the transportation of pollutants. Porous pavement differentiates itself from other stormwater best management practices (BMPs) because it does not require the use of additional open space for stormwater retention.

Porous pavement is typically used for parking stalls, residential/light load driveways, low-use and light load access roads, walkways, and patio areas, and can be implemented as permeable pavers, concrete, or asphalt, as shown in **Figure 7** below. Porous concrete is also available in panels that make it easier and faster to install in applications such as sidewalks.

Figure 7: Porous Pavement Options



Source: https://www.usgs.gov/science

Implementation:

- Porous pavement installation can be implemented in new development, redevelopment, and retrofit projects.
- Retrofit projects in particular present many opportunities to apply green infrastructure techniques. Examples of retrofit projects where porous pavement installation may be feasible include:
  - Replacing a concrete patio with permeable pavers;
  - Replacing parking stalls or residential/light load traffic driveways with porous pavement during a parking lot or driveway replacement or rehabilitation project; and
  - Replacing the walking and cart paths at parks, recreation areas, and golf courses with permeable concrete.

Limitations:

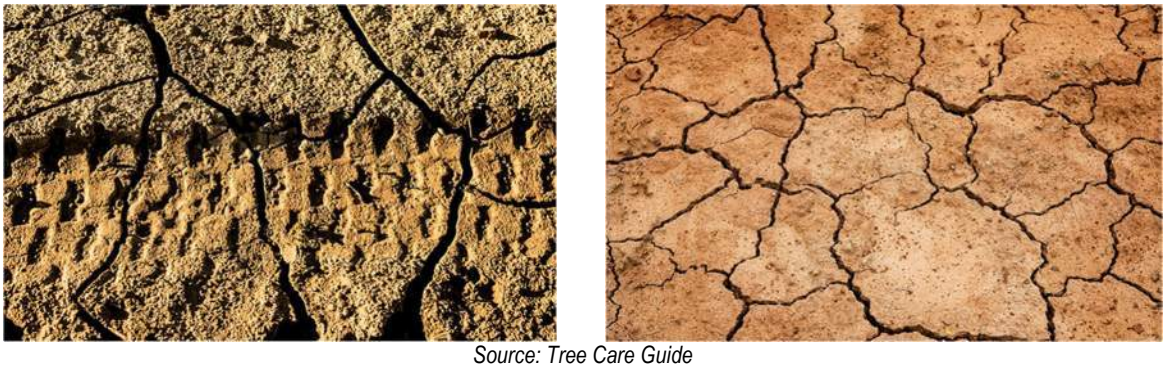
- The percentage of air voids in porous pavement materials reduces the load bearing capacity of the materials in comparison to standard pavement sections. As a result, porous pavement is not intended for high speed and high traffic or heavy load traffic areas.
- The effectiveness of porous pavement can be significantly reduced by sediment and pollutants clogging the void space in the system. Porous pavement systems require considerable maintenance measures, such as vacuuming and jet washing, to maintain a permeable system, as well as additional training for staff and contractors.
- To prevent clogging, porous pavement sections should not be sanded in the winter. Additionally, snow should not be stored on these surfaces. It is worth noting that porous pavement materials typically do not require the same intensity of winter deicing activities as impervious pavements.
- Porous pavement has limitations in areas with high potential pollutant loads, as the pavement system may not provide adequate stormwater treatment prior to infiltration. This can be improved if a filter media is used in the pavement design.
- Porous pavement is not recommended for areas with poorly-draining soils.
- Installation of porous pavement does not reduce heat island effects in comparison to standard paving materials.

2.1.2 Soil Restoration

The use of a property can contribute to soil compaction and soil crusting. Soil compaction occurs when pressure is applied to soil particles, pushing them closer together and reducing the void space between particles. Soil can be compacted by heavy equipment during construction projects, by the continuously applied weight of permanent structures, and by non-permanent loading scenarios, such as cars and machines driving over soils or repetitive use of walking paths.

Soil crusting can occur for a variety of reasons, ranging from physical, biological, and chemical causes. Physical crusts are the most common soil crust types in New England and are primarily classified as structural or depositional. Structural crusts are formed when intense rainfall or irrigation water causes surficial soils to degrade and fine particles within the soil to compact. Depositional crusts are formed when fine particles are transported from eroded areas, via stormwater runoff, and become deposited in a common area, creating a layer of soil with limited void space. See **Figure 8** for images of soil compaction and soil crusting.

Figure 8: Soil Compaction and Soil Crusting (Left to Right)



Source: Tree Care Guide

Both soil compaction and crusting reduce the permeability of surface soils. In areas affected by soil compaction and crusting, the following restoration activities can be completed to increase the permeability of soils:

- Subsurface Restoration: Adding organic material and mechanical tillage to compacted and crusted soils has shown the potential to significantly reduce stormwater runoff.
- Surficial Restoration: Strategies such as seeding bare soils after subsurface restoration, planting trees, and allowing fields to turn to meadows reduces the time it takes for stormwater to flow over land, and thus allows for more stormwater to be infiltrated and treated.

Implementation:

- Former golf courses, areas of agricultural use, and gravel roadways, driveways, and parking lots can likely benefit from soil restoration activities.
- Consider requirements for construction projects to perform subsurface restoration for areas that were affected by heavy equipment traffic and prior to final landscaping activities.
- Identify and encourage soil restoration activities within buffer areas (e.g., riparian zones) to wetland resource areas to maximize the benefits for stormwater management and resource protection to enhance the capacity of these natural systems.

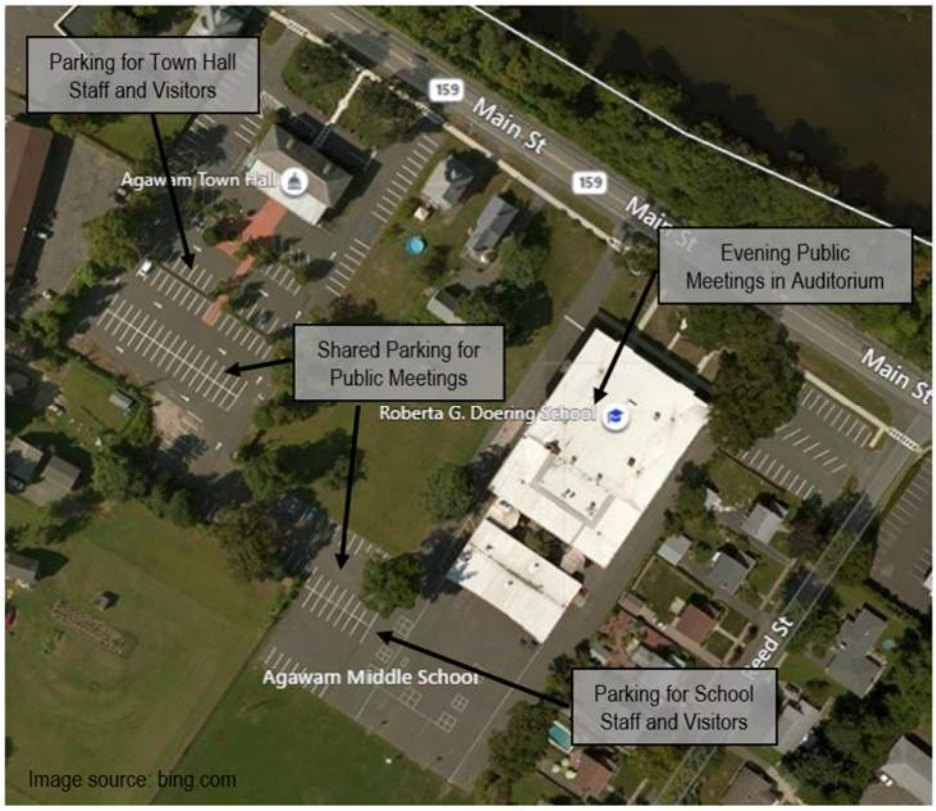
Limitations:

- Physical site constraints, such as equipment access and utilities, may limit access or the ability to conduct certain soil restoration activities.

2.1.3 Shared Impervious Areas

Today it is common for a single property to contain a combination of uses that share common impervious areas, including parking areas, driveways, concrete pads, and other infrastructure. Shared parking is most effective when these uses have significantly different peak parking characteristics that vary by time of day, day of week, and/or season of the year. For example, an office building and a movie theater could share a parking lot since office buildings typically have peak parking demands during standard business hours on weekdays, and movie theaters typically experience peak parking demands after standard business hours and on weekends. Another example is a property that has a diner that serves breakfast and lunch next to a dance studio that has most of its lessons after regular school or work hours. This strategy is common for certain types of municipal property uses since the facilities and parking areas are easier to share. For example, the Agawam Town Hall is adjacent to the Agawam Middle School (see **Figure 9**) and City Council meetings are held in the school's auditorium. The shared parking between these two properties can accommodate parking for large public meetings in the evening and during the day, each property has adequate parking for staff and visitors.

Figure 9: Agawam Town Hall and Middle School – Example Shared Use



Use of this impervious mitigation strategy ultimately results in the reduction of impervious area installation by avoiding larger than necessary parking areas for each property use or prevents the need for expanding impervious areas to accommodate new uses. Similarly, placing multiple project components in close proximity to other site features, such

as residences or commercial buildings, can reduce the amounts of impervious roadways, driveways, and sidewalks needed for site access.

Implementation:

- Encourage compatible property uses for shared impervious areas as part of redevelopment review.
- Review the types of uses at older developments to identify opportunities for shared impervious areas if uses vary significantly from the original development.
- Consider adding language to design standards to require or incentivize developers to design shared impervious areas and implement reduced separation between multiple buildings.

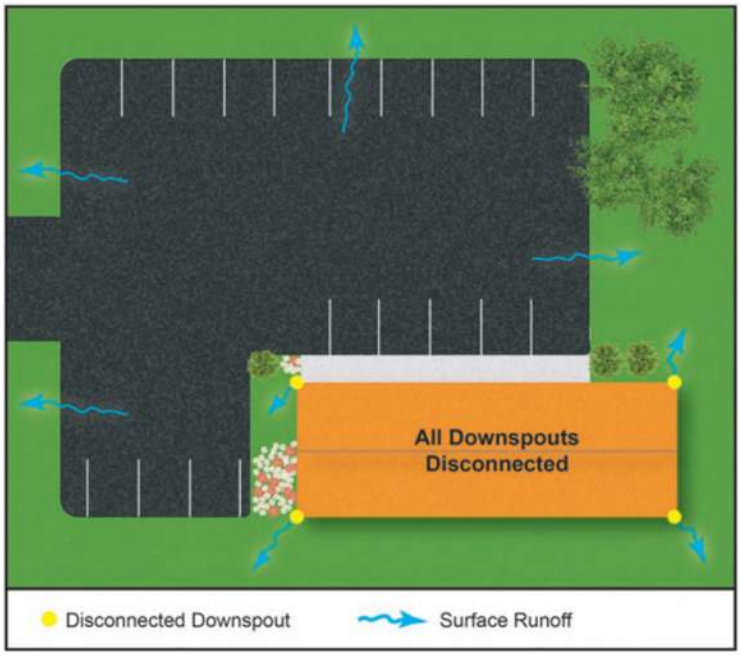
Limitations:

- Intense seasonal use of some properties can be challenging to couple with regular impervious area use demands for other property uses.
- Property owners may perceive shared impervious areas as a management challenge or potential business interruption for tenants when some uses overlap for a short period of time.
- Since property uses can change over time, future uses may not be compatible to share impervious areas and property owners may not be concerned about limiting future options or tenants.

2.2 Impervious Area Disconnection

Impervious area disconnection is a stormwater management practice that consists of directing stormwater runoff from impervious areas to permeable surfaces or stormwater BMPs, rather than directly into a stormwater conveyance system. Impervious surface disconnection reduces the amount of stormwater entering the stormwater management system and allows stormwater to be filtered and either infiltrated into the ground surface or detained, both decreasing peak rates and volumes of stormwater runoff. **Figure 10** illustrates methods of impervious area disconnection. Pavement and rooftop disconnection, as well as redirecting disconnected areas to BMPs, are described in more detail in subsequent sections.

Figure 10: Impervious Area Disconnection



Source: City of Detroit, Michigan

Implementation:

- Educate landowners and developers on the benefits of impervious area disconnection and address any concerns.
- Partner with local companies that specialize in BMP installation. Provide their contact information to landowners and developers to facilitate impervious area disconnection.
- Explore ways to incentivize landowners and developers to disconnect impervious areas.
- Consider revising local stormwater design regulations to incorporate impervious area disconnection practices.

Limitations:

- Impervious area disconnection is more effective in areas with well-draining native soils than in areas with poorly-draining soils.
- Site topography must be pitched away from impervious surfaces and buildings to avoid puddling, flooding, or unsafe icing conditions during freeze/thaw cycles.
- Discharging stormwater runoff directly to the ground surface can cause erosion. Landowners and developers may need to install erosion control matting, splash pads, or other appropriate reinforcing materials to prevent erosion.

2.2.1 Pavement Disconnection

Often, parking lots, driveways, and walkways are designed and graded to direct stormwater runoff towards catch basins and piped conveyance systems. Pavement disconnection (see **Figure 11**) includes directing flows from these paved surfaces towards grassed areas, landscaped areas, or stormwater BMPs. With a focus on strategic grading design of paved surfaces, stormwater flow directions and discharge points can be manipulated to direct stormwater towards well-

draining soils or vegetated buffers and to promote sheet flow. The stormwater runoff to these areas may eventually enter a catch basin to avoid ponding.

Figure 11: Disconnected Pavement Pitched Towards a Vegetated Area

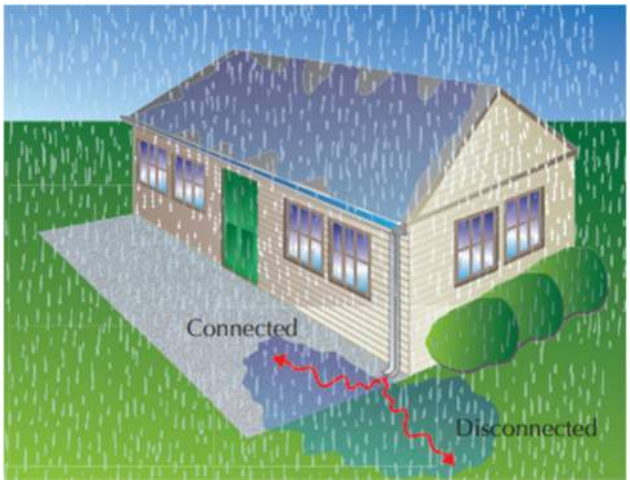


Source: City of Detroit, Michigan

2.2.2 Rooftop Disconnection

Rooftop disconnection involves taking roof runoff, typically collected by gutters, and discharged to driveways, streets, catch basins, or piped conveyance systems, and redirecting it away from impervious surfaces, towards grassed areas, landscaped areas, or stormwater BMPs (see **Figure 12**). Rooftop disconnection is not recommended for metal roofs as stormwater runoff from metal roofs must be directed to treatment devices prior to discharge to filter out suspended and dissolved metals in the runoff.

Figure 12: Rooftop Disconnection



Source: Fox, Laurie

2.2.3 Directing Disconnected Areas to BMPs

Stormwater runoff from disconnected impervious surfaces, including paved areas and rooftops, can be directed towards grassed or landscaped areas or stormwater BMPs. Directing runoff towards stormwater BMPs gives landowners and developers the flexibility to choose systems that serve an intended purpose, such as promoting infiltration, retention, storage, or pollutant removal. Some stormwater BMPs meet several of these objectives. In addition, there are several stormwater BMPs that can be used to meet space constraints, including dry wells, trench drains, rain gardens, planters, rain barrels, and cisterns. **Figure 13** provides images of some of these BMPs.

Figure 13: Dry Well, Rain Garden, and Rain Barrell BMPs (Left to Right)



Source: Massachusetts Department of Environmental Protection

To select a suitable stormwater BMP for specific disconnected impervious areas, refer to the guidance in Volume 2, Chapter 2 of the Massachusetts Stormwater Handbook.

2.3 Impervious Area Impact Reduction

In some situations, impervious area removal and disconnection strategies can be deemed infeasible. Regardless, there are other opportunities to reduce the impacts of impervious areas; repurposing roadway footprints, installing green roofs, and increasing tree canopy cover are just a few. These strategies are described in more detail below.

2.3.1 Repurposing Roadway Footprints

When the reduction of significant roadway footprints, as described in Section 2.1 of this report, is deemed an infeasible impervious area mitigation strategy, consider implementing the following strategies to repurpose portions of large roadway footprints:

- Install grassed planting strips within roadway medians and along sidewalks.
- Install bike lanes on both sides of the roadway. Having designated bike lanes increases the safety of bike riders and can potentially decrease the number of people driving and parking their cars in Town.
- Install parallel parking spaces on one or both sides of the roadway. Street parking spaces can be accounted for to reduce off-street parking lot sizes.
- Install vegetated bump-outs on the sides of a roadway with a curb cut to allow stormwater to drain into the bump-out and get treated.

2.3.2 Green Roofs

Green roofs, also known as vegetated roofs or living roofs, contain permanent vegetated systems and are designed to capture and temporarily store stormwater runoff. Green roofs are typically designed with the components shown in **Figure 14**, below.

Figure 14: Typical Components of a Green Roof System



Source: Massachusetts Department of Environmental Protection

During a precipitation event, stormwater runoff is retained in the growing medium layer of the green roof system. Some of this retained water will either be absorbed by the vegetation rooted in the medium or will evaporate, which actively reduces stormwater runoff volumes discharging from the building's roof. The remainder of the retained stormwater will eventually filter into the green roof system's drainage media, which is slightly pitched to convey flows horizontally towards a typical roof leader system.

Green roofs can be installed on residential, municipal, commercial, and industrial structures, and can have several benefits, including, but not limited to:

- Reducing the peak rate of runoff and runoff volumes from roofs during storm events;
- Reducing heating and cooling costs for buildings by providing an extra layer of insulation to structures;
- Extending the life expectancies of roofs by shielding roofing materials from harmful ultra-violet (UV) rays and high temperatures;
- Reducing urban heat island effects;
- Providing sound insulation; and
- Creating usable and enjoyable spaces for humans, birds, butterflies, and other wildlife.

Implementation:

- Educate landowners and developers on the benefits of green roofs and address any concerns from implementing a green roof system.
- Explore ways to incentivize landowners and developers to implement green roof systems.
- Whether green roofs are planned for new development or redevelopment projects, a structural analysis of the existing or proposed roof must be performed to confirm that the roof can handle the increased loads imposed by the green roof systems and anticipated stormwater storage capacity. Structural strengthening may be required in retrofitting situations.
- Partner with local companies that specialize in structural assessments and green roof design and installation. Provide their contact information to landowners and developers to facilitate the installation of green roofs.
- Consider revising local regulations to provide guidance and language specific to green roof systems.
- Whenever possible, use native plantings that require minimal maintenance.

Limitations:

- Green roof systems work to absorb and evaporate some of the stormwater entering the system, which reduces the volume of stormwater runoff discharging from the building's roof. In watersheds where groundwater recharge is critical, green roofs may not be an appropriate impervious area mitigation strategy.
- In certain environments, or during summer months with low levels of precipitation, green roofs may require irrigation to maintain the system's vegetation.
- Roof access must be available to complete the construction of a green roof system and to perform routine maintenance. These systema may require specialized operation and maintenance training and equipment.
- Green roof systems may be limited on buildings with rooftop electrical or heating, ventilation, and air conditioning (HVAC) systems.

2.3.3 Increasing Tree Canopy Over Impervious Cover

In areas where impervious area removal or disconnection is infeasible, prioritizing impervious areas for increased canopy cover has the potential to yield economic and environmental benefits for the Town and its residents. Tree cover provides two discrete benefits that relate to urban heat effect and stormwater management:

- Reduction of ground and near ground temperatures; and
- Rainfall and snow interception, soil water infiltration, and evapotranspiration.

In addition to these benefits, increased tree canopy helps improve air quality, provide wind breaks, sequester carbon dioxide, provide wildlife habitat, and beautify the community.

The Town of Agawam could consider the development and implementation of a tree planting program that could include targeted planting plans for large, concentrated impervious areas within the Town. The program should consider planting native species that are appropriate for different types of spaces. The program could present simple strategies for tree planting to landowners, such as:

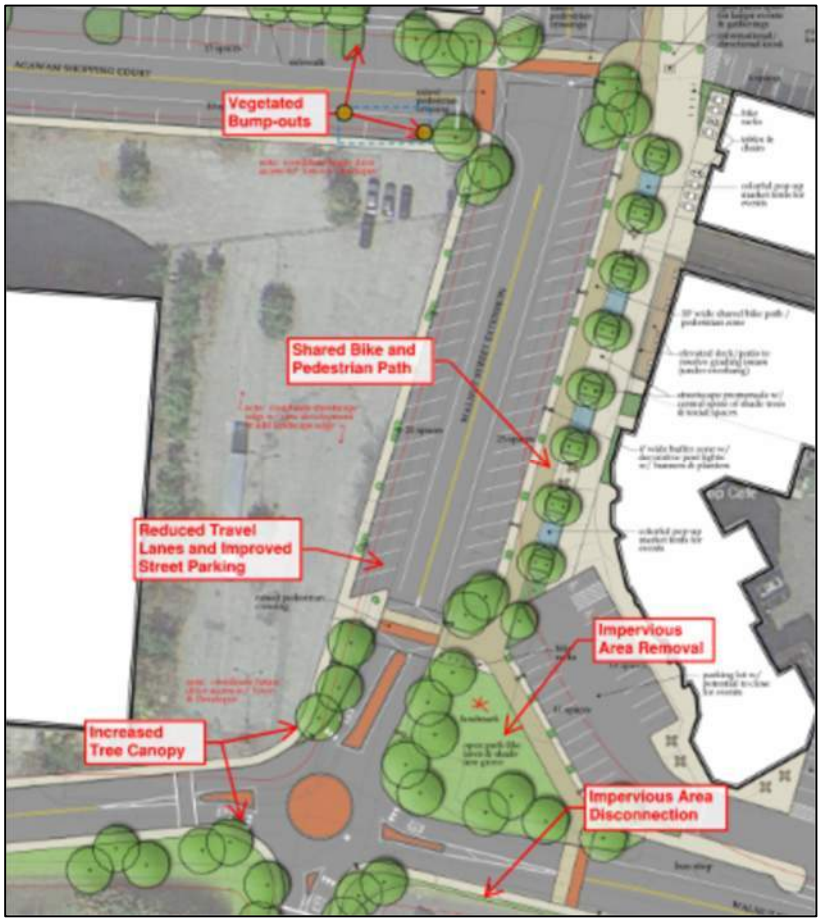
- Adding islands to parking lots and planting trees within them;
- Planting trees around the border of parking lots; and
- Planting trees within grassed strips along sidewalks, grassed medians, or vegetated roadside bump-outs.

2.4 Impervious Area Mitigation Case Study: Walnut Street Extension

The Town of Agawam began reviewing the Walnut Street Extension area in 2016 to develop a conceptual design for improvements to the road corridor that would address vehicle traffic, improve vehicle and pedestrian access to businesses, improve parking, and beautify the street corridor. While impervious area mitigation was not the primary goal for the improvements, the conceptual design includes several of the strategies discussed in this report.

Figure 15 shows a portion of the conceptual design and highlights the proposed impervious area mitigations strategies. The full conceptual design is provided in **Appendix A** and includes a streetscape perspective.

Figure 15: Walnut Street Extension Conceptual Plan and Impervious Area Mitigation Strategies



The Walnut Street Extension case study is a good example of how streetscape improvements and urban renewal, or redevelopment activities can help mitigate stormwater management issues and heat island effect. The Town may wish to consider how additional impervious area mitigation strategies can be incorporated into this conceptual design by working with private property owners to identify additional opportunities, such as further impervious area removal, impervious area disconnection, or green roofs.

3. INCORPORATING IMPERVIOUS AREA MITIGATION STRATEGIES INTO THE COMMUNITY

Long-term sustainable management of the impervious areas in Agawam can be achieved with supportive local policy, holistic and strategic planning efforts, an engaged community, a pragmatic financing strategy, and political support. This section outlines the general approaches that will support the Town's efforts to implement impervious area mitigation strategies. Incentives and potential funding approaches are discussed in the Town's Stormwater Master Plan and can be used to support implementation of impervious area mitigation strategies.

3.1 Review and Update Local Regulations

In many municipalities, the current regulations governing the development and design of impervious areas and stormwater management strategies were written and implemented years ago, prior to the emergence of large-scale climate change discussions and accessible guidance on low impact development or green infrastructure practices. Outdated design standards, zoning ordinances, and subdivision regulations may contain language that promotes the design of unnecessary impervious areas, while also prohibiting or impeding the use of creative engineering solutions and low impact development techniques.

The Town of Agawam has initiated a separate effort with support from the Pioneer Valley Planning Commission to review and update local regulations to support impervious area mitigation strategies and improved stormwater management. In support of this effort, the following suggested changes or considerations are summarized from preceding sections of this report:

- Reduce requirements for roadway widths and driveway, parking lot drive aisle, and parking stall dimensions where feasible and appropriate.
- Provide options for turnaround designs on dead-end streets and establishing maximum turnaround sizes that account for emergency vehicle turning radii, while also minimizing impervious cover.
- Promote additional bus stops to large shopping centers to reduce the need for parking.
- Consider instituting a maximum parking standard for certain property types and requirements to provide a certain percentage of spaces on pervious materials when overflow parking is needed.
- Reduce parking space quantity requirements, especially for facilities within a certain distance of public transit stops or with shared parking arrangements.
- Increase requirements for percentages of compact car and motorcycle parking spaces in parking lots.
- Encouraging the construction of walking paths, sidewalks, and bike racks to allow for alternate means of transportation to facilities.
- Encourage the use of porous pavement alternatives in lieu of traditional pavement sections where appropriate.
- Encourage the routing of rooftop runoff from non-metal roofs towards pervious areas or stormwater BMPs.
- Consider revising local regulations to provide guidance and language specific to green roof systems.
- Consider requirements for construction projects to perform subsurface restoration for areas that were affected by heavy equipment traffic and prior to final landscaping activities.
- Consider adding language to design standards to require or incentivize developers to design shared impervious areas and implement reduced separation between multiple buildings.
- Consider revising local stormwater design regulations to incorporate impervious area disconnection practices.

- Consider an overlay district in areas with significant impervious areas and a lack of tree canopy that requires redevelopment projects to meet additional requirements to mitigate impacts.

3.2 Aligning Impervious Area Mitigation Efforts with Planning and Economic Development Goals

It is important to recognize that this is one of many initiatives to ensure that Agawam is a thriving and sustainable community. There are several ways for the Town of Agawam to incorporate impervious area mitigation and low impact development strategies into Town-wide planning and economic development goals, including, but not limited to:

- Incorporating low impact development techniques into upcoming municipal projects, such as utility work, roadway repair, or sidewalk projects.
- Incorporating more rigorous low impact development requirements into the Town's project review process.
- Incorporating specific low impact development goals into the Town's department, board, and commission goals.
- Strategically acquiring properties or working with property owners to restore areas to a pervious, vegetated condition, such as abandoned commercial and industrial facilities.
- Identifying future redevelopment sites and establishing goals and incentives to mitigate impervious area impacts.
- Leveraging multiple funding sources to support community redevelopment to bring significant visible benefits to the community and also mitigate the impacts of impervious areas.

Aligning impervious area mitigation efforts with the Town's planning goals will move Agawam towards a resilient community that is better prepared to address existing impacts and potential effects from climate change.

3.3 Education and Outreach

Community engagement is critical to establish a common goal between the Town of Agawam and individual landowners and developers. To begin a dialogue regarding impervious area mitigation and the implantation of low impact development techniques on private properties, the Town should first educate the public on the negative impacts of impervious areas, opportunities to mitigate these impacts, and the importance of vegetated areas, tree cover, and clean stormwater in the community.

Ideas that the Town could use to implement an education and outreach program are as follows:

- Implement multiple impervious area mitigation strategies at municipal properties that are frequented by the public, such as schools, the library, and Town Hall. These projects can serve as demonstration projects to educate the public and be incorporated into school curricula.
- Update current outreach methods for residential, commercial, and industrial landowners with an emphasis on impervious area impacts and mitigation strategies. This could also be a separate outreach campaign.
- Develop educational content, in the form of mailings, website postings, or social media postings, that will provide basic information to illustrate the Town's impervious area mitigation goals. The content should consider the varying property types and the most relevant impervious area mitigation strategies.
- Initiate surveys by mail, phone, or in-person to evaluate:
    - What activities are conducted on properties that may affect stormwater quality?
    - Are properties connected to municipal stormwater infrastructure?

- Are there control practices in place on properties to manage stormwater quality and quantity?
- Are there plans for construction projects or repaving in the near future?
- Is there interest in learning more about how impervious area mitigation strategies could be implemented at your property?

- Utilize the results of the survey to identify willing private properties that would benefit significantly from impervious area mitigation or low impact development techniques.
- Reach out to property owners in areas where road or utility improvements are planned to evaluate opportunities to expand impervious area mitigation strategies.
- Initiate school programs to educate students on ways they can help protect the Town of Agawam's water resources.
- Identify local contractors that can provide impervious area mitigation services, such as porous pavement installation, BMP installation, green roof design and construction, and "stormwater friendly" landscaping services. Considering posting a list of these contractors to the Town's website or distributing their contact information within an outreach mailing.

3.4 Implementing Projects at Municipal Properties

Implementation of the impervious area mitigation strategies outlined in this report at municipal properties can often be completed for a relatively low cost and it is an effective approach to support public education in highly visible areas. Municipal properties should be a high priority to implement impervious area mitigation strategies and other stormwater management retrofits.

Town-owned properties with greater than 1 acre of impervious area are summarized in Table 3.

Table 3: Municipal Properties with >1 Acre of Impervious Area

Property Name	Address	Parcel ID	Impervious Area (Acres)
Agawam High School	760 Cooper Street	H11 2 9	15.2
Robinson Park Elementary School	65 Begley Street	H15 5 11	7.9
Agawam Junior High School	1305 Springfield Street	E9 2 2	6.1
Agawam DPW	1000 Suffield Street	I7 1 2	6.0
Agawam Municipal Golf Course	128 Southwick Street	D10 1 6	4.8
James Clark Elementary School	65 Oxford Street	J4 1 6	4.5
Springfield Street Cemetery	0 Springfield Street	F10 6 11	3.4
Benjamin Phelps Elementary School	689 Main Street	L10 5 1	3.4
Clifford Granger Elementary School	31 South Westfield Street	E9 2 13	2.9
Roberta Doering Middle School	68 Main Street	J14 7 37	2.6
Perry Lane Preschool and Park	108 Perry Lane	J9 3 3	2.5
Bogarrti Park	0 River Road	L6 5 12	2.4
Agawam Town Hall	36 Main Street	J15 5 3	2.2
Cemetery	820 Main Street	K9 2 14	2.1
Agawam DPW	1347 Main Street	K5 2 8	2.0
Agawam Police Headquarters	681 Springfield Street	G12 10 4	1.5
Agawam Library	750 Cooper Street	H11 2 13	1.4
		Total	**71.9**

Further evaluation of the existing stormwater management and any treatment systems at these properties is recommended to identify the best opportunities for retrofits with consideration of any upcoming site improvements. Some properties may have existing stormwater treatment systems; however, implementation of additional, highly visible impervious area mitigation techniques can be implemented as demonstration projects to support public education.

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APPENDIX A: WALNUT STREET EXTENSION CONCEPTUAL PLAN



D R A F T PREFERRED OPTION

WALNUT STREET EXTENSION STREETSCAPE IMPROVEMENTS - CONCEPTUAL DESIGN

AGAWAM, MASSACHUSETTS FEBRUARY 23, 2016

0 15 30 60 ft

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Tighe&Bond Consulting Engineers Environmental Specialists

A. T. LEONARD & ASSOCIATES
LANDSCAPE ARCHITECTURE · PLANNING



EXISTING CONDITIONS

WALNUT STREET EXTENTION STREETSCAPE IMPROVEMENTS

AGAWAM, MASSACHUSETTS FEBRUARY 23, 2016

Tighe&Bond
Consulting Engineers
Environmental Specialists

A. T. LEONARD & ASSOCIATES
SHAPING LANDSCAPES FOR LIVING AND LEARNING



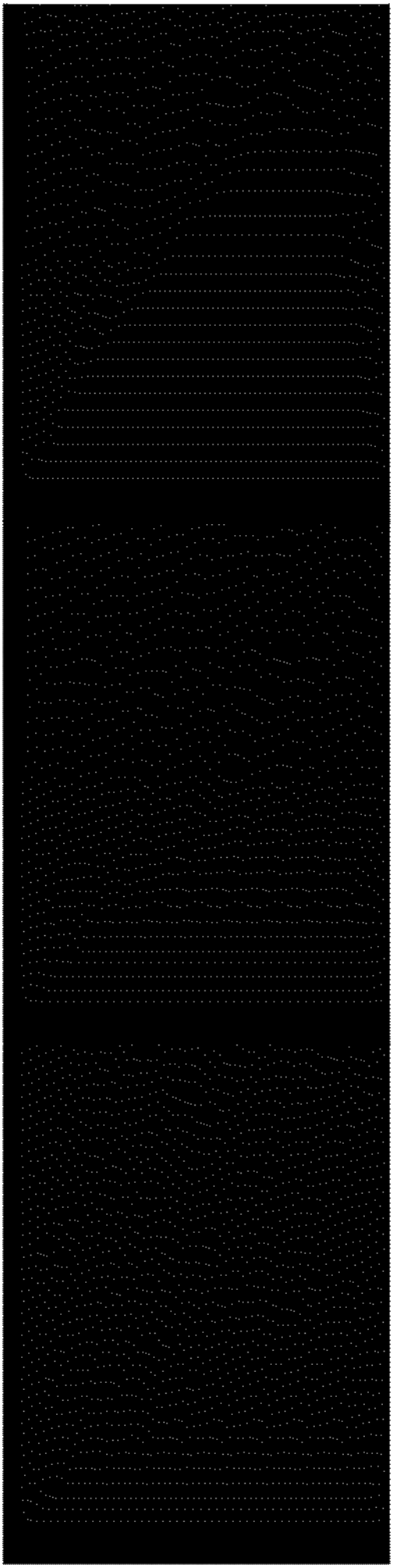
PROPOSED IMPROVEMENTS

WALNUT STREET EXTENTION STREETSCAPE IMPROVEMENTS

AGAWAM, MASSACHUSETTS FEBRUARY 23, 2016

Tighe&Bond
Consulting Engineers
Environmental Specialists

A. T. LEONARD & ASSOCIATES
SHAPING LANDSCAPES FOR LIVING AND LEARNING



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COMMITMENT & INTEGRITY DRIVE RESULTS

APPENDIX F: PIONEER VALLEY PLANNING COMMISSION CODE AUDIT

Catalyst for Regional Progress
PVPC
Kimberly H. Robinson, MUP
Executive Director

Memorandum

To: Regulatory Review Advisory Working Group, Town of Agawam
Planning and Community Development – Marc Strange and Pam Kerr
Department of Public Works – Mario Mazza, John Decker, Michelle Chase, Mike Albro, Tracy DeMaio

From: Patty Gambarini and Corrine Meise-Munns, PVPC

Re: MVP Action Grant - Agawam Regulatory Review for Climate Resilience

Date: June 16, 2021

Overview of Regulatory Work Accomplished

Under Agawam's MVP Action Grant, PVPC staff met a total of 7 times with the Regulatory Review Advisory Working Group. At the first meeting, PVPC presented an overview of the proposed work to be covered and facilitated discussion about best approach. Meetings 2 through 5 focused on extracting stormwater management requirements and standards from the General Code of Ordinances, Chapter 175, covering Sewer and Water, to create a stand-alone Chapter 176 devoted to stormwater management with associated detailed regulations. Meeting 6 focused on Low Impact Development practices and policies in the Town's Zoning Ordinance and Subdivision Rules and Regulations, and meeting 7 focused on discussion of the options to develop a local Wetlands Protection Ordinance (which PVPC learned is already in process), a local Green Streets and Infrastructure Policy, and updates to the Flood Plain Overlay District within the Zoning Ordinance. More detail on each element is provided below and all final marked up documents are attached as appendixes to this Memorandum.

Concurrent with PVPC's regulatory review work, the engineering consultants under this same MVP grant prepared an Impervious Mitigation Strategy that included several recommendations for updates to local regulations. While PVPC's work with the working group happened to address most of these recommendations, there are a few that the Town might consider going forward. These include the following:

- Consider revising local regulations to provide guidance and language specific to green roof systems.

- Consider an overlay district in areas with significant impervious areas and a lack of tree canopy that requires redevelopment projects to meet additional requirements to mitigate impacts.

Changing Climate and Regulatory Considerations

For Agawam, the greatest climate change considerations involve increased heat, including warmer winters and more summer days of 90 degrees or more, and greater variability in rainfall, including greater frequency of larger storms and increasing consecutive dry days. Fortunately, strategies to deal with these changes are fully complementary in that reduced impervious cover and greater use of green infrastructure help to cool during hot temperatures, as well as create a landscape more able to absorb increased rainfall that reduces runoff volumes, but also infiltrates to help sustain ecosystems and human communities through dryer periods.

As such, the overall aim of regulatory review work with the Town has been to institute development and redevelopment project review processes and standards that advance low impact approaches, including reductions in impervious cover, wider use of green infrastructure, nature-based solutions, and trees. At the same time, regulatory review work helped with Town compliance on new requirements under the State's Flood Hazard Mitigation and National Flood Insurance programs and EPA and MassDEP's Municipal Separate Storm Sewer System (MS4) permit.

Stormwater Management Ordinance and Regulations

Sections that address stormwater management were pulled from Chapter 175 in the General Code of Ordinances (which also includes sewer and water) to establish a stand-alone Chapter on stormwater to be referred as Chapter 176. Stormwater Management is addressed in Article III of this new Chapter and includes an important update in the size of projects to be covered by a stormwater management permit. Because impervious surface is such an important factor in the problems of localized flooding in Agawam, the working group decided to include review for smaller development and redevelopment projects that will create between 5,000 and up to but not including 43,560 square feet of disturbance. These projects require an "administrative" review process. Larger projects that will create 5,000 square feet or more of impervious surface or that will disturb one or more acres of land require a full stormwater management permit review. The review process, standards, and plan submission requirements are further elaborated in the associated Regulations. Important elements written into the Regulations for greater climate resiliency and compliance with the MS4 permit include:

- A pre-application and concept plan meeting that gets project proponents thinking early in the process about a low impact development approach. PVPC has developed a pre-application checklist for use with such meetings that entail preparation of three simple maps: 1. an existing resources site analysis map that identifies, locates, and describes noteworthy features to be designed around; 2 a hydrologic soils group (HSG) map and soils description of site and abutting properties using NRCS's web soil survey on-line mapping tool; and 3. a sketch plan, based on the existing resources/site analysis and soils map, that illustrates conceptual layout of the proposed development or redevelopment.

- Rainfall data recommendations that currently tie to NOAA Atlas 14, Plus (what MassDEP has indicated will be associated with the updated Massachusetts Stormwater Handbook) to account for current precipitation. The working group talked about considerations of future rainfall amounts

through RMAT and agreed it will be important once the tool has been finalized to determine whether an updated approach to rainfall data use ought to be adopted for local projects.

- Requirement of low impact development in all development and redevelopment projects to meet volume and pollutant removal objectives and to reduce impervious surface. This includes alternative design for streets, driveways, and parking. For redevelopment projects that cannot meet volume or pollutant removal objectives on site for technical reasons, there is an option to mitigate for impacts off site within the same subwatershed area.

- LID standards include some new specifications, including:
    - tree protection for stands of trees and trees with a trunk diameter at breast height of 8 inches or more
    - naturally vegetated buffers along all perennial streams and other water features, and prohibition of mowing and brush hogging within riparian buffers
    - coldwater fishery protection with mapping of such resources and mitigation of potential thermal impacts from development
    - avoid soil compaction through best practices, including reducing the number of trips required over area of disturbance, laying down soil protective mats for trafficked areas, avoiding work after rain or snowmelt that soaks soils, using construction vehicles with low axle loads, reduced tire pressures, and use of flotation tires, doubles, radial tires, and/or large-diameter tires.

- Inspections required to be conducted by the stormwater design engineer before the stormwater system elements are buried, a punch list inspection, and final inspection, with video of all stormwater pipes installed, to ensure full and proper functioning of all stormwater management BMPs.

Subdivision Regulations

PVPC conducted a regulatory review and developed recommended updates to the Town of Agawam Subdivision Rules & Regulations to promote a sustainable site design process, standards that translate to resilient development, and to remove any possible conflict with the updated Stormwater Management Ordinance and Regulations. The regulatory review was guided by a Low Impact Development Review Checklist developed by PVPC with guidance from the Center for Watershed Protection's *Code and Ordinance Worksheet*, U.S. EPA's *Water Quality Scorecard*, MAPC's *Low Impact Development Toolkit Checklist for Regulatory Review*, and U.S. EPA's *Assessing Street and Parking Design Standards to Reduce Excessive Impervious Cover.*

The regulatory review revealed that Agawam's Subdivision Rules and Regulations generally did not promote LID best practices for the reduction of extraneous impervious surfaces, such as in street rights-of-way, or the preservation of natural resources, such as stands of trees or trees of a certain size.

Recommendations were made within the code to promote:

- Better integration of a LID process from project initiation through the definitive plan review:
  - Advancing pre application concept meeting described under Stormwater Regulations before submission of a Preliminary Plan
  - Within the Preliminary Plan and Definitive Plan, requiring mapping of natural resources and environmental features such as soil types, depth of bedrock, BioMap2 Core Habitats and Critical Natural Landscapes, the extent of Interim Wellhead Protection Areas and Recharge Areas, stands of trees and trees with a trunk diameter at breast height of 8 inches or more, and other natural features of note
  - Requiring a reduction in cut and fill practices, requiring limits to disturbance on the construction site, minimizing disturbance of hillsides and/or ridgelines, and encouraging preservation of natural preservation.

- Adoption of LID standards for Right-of-Way and Street Design and Layout:
  - Reducing requirements for roadway width and length to avoid generation of extraneous impervious area, while still meeting MA 527 CMR Fire Code requirements
  - Promoting turn arounds that minimize impervious surface and capitalize on opportunities for infiltration of stormwater flows
  - Promoting context-sensitive design for pedestrian and cyclist amenities, such as based on expected Average Daily Trips (ADT) on a given street (allowing for shared roadways on streets with ADT below 400; and adding dedicated sidewalks and cycling lanes as the ADT increases)
  - Allowing for perforated curbs or "country drainage" where appropriate
  - Requiring a set number of trees to be planted at set distances within the tree belt

- Green Stormwater Management within Subdivision Regulations:
  - Explicitly permitting LID stormwater management approaches
  - Ensuring drainage and stormwater management regulations are consistent with and/or refer to the updated Stormwater Management Ordinance and Regulations, to avoid future conflict

Zoning Ordinance

The goal of the regulatory review of the Zoning Ordinance was to promote a sustainable site design process and standards that translate to resilient development, and to determine whether additional elements could help promote resilience. As with the Subdivision Rules and Regulations regulatory review described above, the review was conducted with a Low Impact Development Review Checklist, developed by PVPC with guidance from the Center for Watershed Protection's *Code and Ordinance Worksheet*, U.S. EPA's *Water Quality Scorecard*, MAPC's *Low Impact Development Toolkit Checklist for Regulatory Review*, and U.S. EPA's *Assessing Street and Parking Design Standards to Reduce Excessive Impervious Cover*.

PVPC found that the Town's Zoning Ordinance inconsistently delineated standards for landscaping, parking, and development policies across zoning districts, which led to confusion as to whether some standards were missing from the Ordinance itself. Therefore, recommendations were made to address both the content and the formatting of the Zoning Ordinance:

- Formatting of the Zoning Ordinance:
  - A general recommendation to clearly elucidate parking, landscaping and screening/buffering, standards for all zoning districts

- Parking and Parking Lot Guidelines:
  - Ensure parking standards are identified in each zoning district
  - Follow LID standards for number and dimensions of parking spaces for both residential and commercial zoning districts/uses
  - Adopt provisions to allow for shared parking among businesses by right, especially if those businesses have different windows of peak hours
  - Allow alternative measures such as custom parking demand calculations, transportation demand management or in-lieu payments to reduce required parking
  - Require, or explicitly allow, vegetated areas within parking spaces to be designed to serve as green stormwater management systems
  - Encourage, or explicitly allow, the use of the porous surfacing materials to be used for parking stalls

- Development Policies in Zoning:
  - Ensure code that governs drainage and stormwater management within Zoning is consistent with the updated Stormwater Management Ordinance and Regulations, or refers out to it
  - Require the mapping of existing natural resources/vegetation in Site Plan Review application
  - Encourage, or explicitly allow, screening and buffer areas to be used for vegetated green stormwater management
  - Ensure screening/buffer and landscaping requirements are identified for each zoning district
  - Allow landscaping requirements to be used for green stormwater management when appropriate
  - Consider explicitly allowing the open space in Open Space Residential Developments to house green stormwater management systems as appropriate
  - Require tree protection for stands of trees and trees with a trunk diameter at breast height of 8 inches or more

Zoning Ordinance – Floodplain Overlay District

To understand updates to comply with the new requirements of the National Flood Insurance Program (NFIP), PVPC worked with the state model to update Agawam zoning related to its floodplain overlay district and then conferred further with the Massachusetts State National Flood Plain Insurance Program Coordinator. Recommended changes to Agawam's General Code of Ordinances, Chapter 180 – Zoning Bylaw, include changes within the definitions and in Article XII on the Flood Plain Overlay District. Recommended changes within Article XII, include a more elaborated section on purpose, corrected

references to FEMA maps and supporting studies, clarification on who serves as the Floodplain Administrator, standards that update requirements, clarification on permitting required and where permitting for proposed developments in the Floodplain Overlay Distric falls in the review process (last).

Adoption: Massachusetts State National Flood Plain Insurance Program Coordinator Joy Duperault has indicated that as there are no projected date for new maps for the Westfield watershed (including Agawam), the town can aim to adopt the new bylaws at any time in the near future.

Tree and Forest-Friendly Practices

As described in the preceding sections in this document, recommendations for the preservation and protection of trees of significant size (8 inches in diameter at breast height or greater) and existing stands of trees were woven into Agawam's Stormwater Management, Zoning, and Subdivision codes. Further recommendations were made to increase the planting of trees during development projects, with recommendations to require tree planting within the tree belt in subdivision projects, and to require tree planting within parking lots and within property buffers.

Green Infrastructure – Green Streets Policy

PVPC shared its current model Green Streets and Infrastructure Policy with the advisory working group. The group expressed interest in the policy and thought the adoption of a policy, with some amendments, could support town staff as they negotiate with private developers to employ an LID process in development design and to include green infrastructure systems as part of their stormwater management plans. The working group determined that the town will need to work further to identify local goals for Green Streets and Infrastructure, and therefore did not request any customization of the model at this time.

Appendixes to this Memorandum

1. New Chapter 176 for Stormwater Management
2. New Regulations for Stormwater Management and Erosion and Sediment Control
3. LID Checklist for Pre-Application Meeting
4. Erosion and Sediment Control Inspection Form
5. LID review checklist for Subdivision Regulations
6. Subdivision Regulations with recommended updates in track changes
7. LID review checklist for Zoning Ordinance
8. Zoning Ordinance with recommended updates in track changes
9. Floodplain Overlay District (definitions and Article XII in Zoning Ordinance) with recommended updates in track changes
10. Model Green Infrastructure – Green Streets Policy

PROPOSED NEW
Chapter 176
STORMWATER MANAGEMENT
DRAFT 5-4-21

ARTICLE I: GENERAL PROVISIONS

Section 1: Authority
Section 2: Definitions
Section 3: Regulations
Section 4: Enforcement
Section 5: Severability
Section 6: Transitional Provisions

ARTICLE II: ILLICIT CONNECTIONS AND DISCHARGES

Section 1: Purpose
Section 2: Applicability
Section 3: Prohibited Activities
Section 4: Emergency Suspension of Storm Drain System
Section 5: Watercourse Protection
Section 6: Notification of Spills

ARTICLE III: STORMWATER MANAGEMENT PERMIT

Section 1: Purpose
Section 2: Applicability
Section 3: Administration

ARTICLE I
GENERAL PROVISIONS

SECTION 1: AUTHORITY

This Ordinance is adopted under the authority granted by the Home Rule Amendment of the Massachusetts Constitution and the Home Rule Procedures Act, and pursuant to the regulations of the Federal Clean Water Act found at 40 CFR 122:34.

Commented [P1]: Steve, note that I am not entirely clear on nomenclature here. Can we reference this as Ordinance or do we need to refer to as Chapter or Article? Note that the Regulations reference Chapter 176 in a few places.

The Superintendent of the Department of Public Works or designated representative shall administer, implement and enforce this Ordinance. Any powers granted to or duties imposed upon the Superintendent of the Department of Public Works may be delegated in writing by the Superintendent of the Department of Public Works to employees or agents of the Department of Public Works.

SECTION 2: DEFINITIONS

A. Word usage. "Shall" is mandatory; "may" is permissive.

B. Definitions. Unless the context specifically indicates otherwise, the meanings of terms used in this chapter shall be as follows:

ABUTTER — One who holds title to real property within the limits of an improvement area, and his successors in title**.**

ACRE ─ A unit of land equal to 43,560 square feet.

ACTIVE GROUNDWATER DEWATERING DEVICE — Any active device used to transport groundwater, i.e. a sump pump.

ALTER ─ Any activity that will measurably change the ability of a ground surface area to absorb water or will change existing surface drainage patterns. Alter may be similarly represented as “alteration of drainage characteristics,” and “conducting land disturbance activities.”

AGRICULTURAL ACTIVITY ─ Producing or raising one or more of the following agricultural commodities for commercial purposes:
1. animals, including but not limited to livestock, poultry, and bees;
2. fruits, vegetables, berries, nuts, maple sap, and other foods for human consumption;

and

3. feed, seed, forage, tobacco, flowers, sod, nursery or greenhouse products, and ornamental plants or shrubs.

and as further defined by the Massachusetts Wetlands Protection Act and its implementing regulations.

APPLICANT — A property owner or agent of a property owner who has filed an application for a Stormwater Management Permit.

AS-BUILT DRAWING: Drawings that completely record and document applicable aspects and features of conditions of a project following construction using Stormwater Management Plans derived from a Stormwater Management Permit.

AUTHORIZED ENFORCEMENT AGENCY — The Department of Public Works, its employees, or agents designated to enforce this chapter on behalf of the Superintendent**.**

BEST MANAGEMENT PRACTICES (BMP) — Structural, nonstructural, and managerial techniques that are recognized to be the most effective and practical means to prevent and/or reduce increases in stormwater volumes and flows, reduce point source and nonpoint source pollution, and promote stormwater quality and protection of the environment. “Structural” BMPs are devices that are engineered and constructed to provide temporary storage and treatment of stormwater runoff. “Nonstructural” BMPs use natural measures to reduce pollution levels, do not require extensive construction efforts, and/or promote pollutant reduction by eliminating the pollutant source.

BETTER SITE DESIGN ─ Site design approaches and techniques that can reduce a development’s impact on the watershed through the use of nonstructural stormwater management practices. Better site design includes conserving and protecting natural areas and green space, reducing the area of impervious surface, and using natural features for stormwater management.

CERTIFICATE OF COMPLETION (COC) ─ A document issued by the Stormwater Authority after all construction activities have been completed, which states that all conditions of an issued Stormwater Management Permit have been met and that a project has been completed in compliance with the conditions set forth in a Stormwater Management Permit.

CLEAN WATER ACT — The federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

COMMON PLAN OF DEVELOPMENT OR SALE - A contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan.

CONVEYANCE – Any structure or device, including pipes, drains, culverts, curb breaks, paved swales or man-made swales of all types designed or utilized to move or direct stormwater runoff or existing water flow.

DEP or DEPARTMENT OF ENVIRONMENTAL PROTECTION — A department of the Commonwealth of Massachusetts which regulates environmental concerns, including but not limited to the Wetland Protection Act and as co-permittee-of certain NPDES permits with the EPA.

DPW or DEPARTMENT OF PUBLIC WORKS — The administrative body for public works in the Town of Agawam.

DISCHARGE — The following are the definitions of terms used in this section:

1. DIRECT STORMWATER DISCHARGE — The discharge of treated or untreated stormwater directly to the MS4, which may or may not subsequently discharge to the waters of the Commonwealth of Massachusetts, including rivers, streams, brooks, or wetlands.
2. ILLICIT STORMWATER DISCHARGE — Any non-stormwater discharge into the municipal separate storm sewer system (MS4), except as specifically exempted in this code. Discharges which are in compliance with a NPDES stormwater discharge permit are not illicit discharges.
3. INDIRECT STORMWATER DISCHARGE — The discharge of treated or untreated stormwater to the waters of the Commonwealth of Massachusetts, including rivers, streams, brooks, or wetlands, without a connection to or discharge to the municipal separate storm sewer system (MS4) before flows reach the water resource.
4. STORMWATER DISCHARGE — The discharge of treated or untreated stormwater to the Town's MS4.
5. DISCHARGE OF POLLUTANTS — The addition from any source of any pollutant or combination of pollutants into the municipal storm drain system or into the waters of the United States or Commonwealth from any source.

DRAINAGE EASEMENT – A legal right granted by a landowner to a grantee allowing the use of private land for stormwater management purposes.

DRAINAGE SYSTEM — Same as stormwater system, storm sewer system.

DRAIN LATERAL OR CONNECTION — Drainage service connections are private structures to be owned and maintained by the property owner to the point where it connects to a stormwater main, manhole, or catch basin in the street right-of-way or Town's easement.

DUMPING — An act or omission of any person or entity, the proximate result of which is the introduction of pollutant(s) to the MS4, which is an illicit discharge.

EPA or ENVIRONMENTAL PROTECTION AGENCY — The United States Environmental Protection Agency, a department of the federal government that requires compliance with the Clean Water Act and NPDES permitting.

EROSION – The wearing away of the land surface by natural or artificial forces, such as wind, water, ice, gravity, or vehicle traffic, and subsequent detachment and transportation of soil particles.

EROSION CONTROL ─ The prevention or reduction of the movement of soil particles or rock fragments.

EROSION AND SEDIMENT CONTROL PLAN ─ Is a document containing narrative, drawings and details—developed by a qualified professional engineer (PE) or a certified professional in erosion and sedimentation control (CPESC) — that includes best management practices or equivalent measures designed to control surface runoff, erosion, and sedimentation during construction and construction-related land disturbance activities.

EXISTING DISCHARGE — Any discharge to the MS4 which is under construction or operation at the time of the enactment of this definition.

FLOOD CONTROL ─ The prevention or reduction of flooding and flood damage.

FLOODING ─ A local and temporary inundation or a rise in the surface of a body of water, such that it covers land not usually under water.

FOREST CUTTING PLAN ─ A plan for the cutting of trees on forest land, which is prepared and submitted in accordance with M.G.L. Chapter 132 Sections 40 - 46A. The forest cutting plan requires approval by a Service Forester of the Massachusetts

Department of Conservation and Recreation, as provided under 304 CMR 11.04.

GRADING – Changing the level or shape of the ground surface.

GROUNDWATER – All water beneath any land surface including water in the soil and bedrock beneath water bodies, but not including water in manmade structures.

GROUNDWATER RECHARGE — The process by which groundwater is replenished by precipitation through the percolation of runoff and surface water through the soil.

GRUBBING – The act of clearing land surface by digging up roots and stumps.

HAZARDOUS MATERIAL OR WASTE – Any material, which because of its quantity, concentration, chemical, corrosive, flammable, reactive, toxic, infectious or radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential threat to human health, safety, welfare, or to the environment. Toxic or hazardous materials include any synthetic organic chemical, petroleum product, heavy metal, radioactive or infectious waste, acid and alkali, and any substance defined as Toxic or Hazardous under M.G.L. Ch.21C and Ch.21E, and the regulations at 310 CMR 30.000 and 310 CMR 40.0000.

ILLICIT CONNECTION — Any surface flow or conveyance of flows to the MS4 which contains non-stormwater discharges except as exempted within this chapter.

ILLICIT STORMWATER DISCHARGE — Any direct or indirect non-stormwater discharge into the municipal separate storm sewer system (MS4), including without limitation sewage, process wastewater, or wash water, and any connections from indoor drains, sinks, or toilets, regardless of whether said connection was previously allowed, permitted, or approved before the effective date of this Article. Specific exemptions are described in this chapter. Discharges which are in compliance with a NPDES stormwater discharge permit are not illicit discharges.

IMPERVIOUS SURFACE – Any material or structure on or above the ground that reduces the infiltrating capacity of soils or prevents water from infiltrating through the underlying soil. Impervious surface is defined to include, without limitation: paved parking lots and roads, rooftops, driveways, patios, and other paved and gravel surfaces.

IMPROVEMENT AREA — The area served by the proposed drainage project, the boundaries of which shall include only those parcels or portions of parcels that could be directly connected to the proposed common sewers or drains, such

that a building sewer or drain would not have to pass through adjacent private land to serve each parcel.

INDIRECT STORMWATER DISCHARGE — The discharge of treated or untreated stormwater to the waters of the Commonwealth of Massachusetts, including rivers, streams, brooks, or wetlands without a connection to or discharge to the municipal separate storm sewer system (MS4) before flows reach the water resource.

INFILTRATION ─ The downward movement of water from the surface to the subsoil so as to permit groundwater recharge and the reduction of stormwater runoff from a project site.

LAND USE WITH HIGHER POTENTIAL POLLUTANT LOAD (LUHPPL) – Land uses such as auto salvage yards, auto fueling facilities, exterior fleet storage yards, vehicle service and equipment cleaning areas, commercial parking lots with high intensity use, road salt storage areas, outdoor storage and loading areas of hazardous substances, confined disposal facilities and disposal sites, marinas, boat yards, or other uses identified by the Massachusetts Stormwater Handbook.

LOW IMPACT DEVELOPMENT (LID) ─ A development strategy that seeks to mimic (or in the case of redevelopment, restore/recreate) a site's predevelopment hydrology through protection of on-site natural features and better site design that limits impervious areas, preserves open space, and uses decentralized small scale facilities to capture and manage rainfall (or snowmelt) close to where it falls. These small-scale facilities serve to slow, absorb, and treat flow and include bioretention areas, grassed swales, porous pavements, cisterns, and green roofs and walls.

MASSACHUSETTS STORMWATER HANDBOOK AND STORMWATER STANDARDS ─ The guidance issued by MassDEP, and as amended, that coordinates the requirements prescribed by state regulations promulgated under the authority of the Massachusetts Wetlands Protection Act G.L. c. 131 § 40 and Massachusetts Clean Waters Act G.L. c. 21, §. 23-56. The Handbook and Standards addresses stormwater impacts through implementation of performance standards to promote increased stormwater recharge, the treatment of more runoff from polluting land uses, low impact development (LID) techniques, pollution prevention, the removal of illicit discharges to stormwater management systems, and improved operation and maintenance of stormwater best management practices (BMPs). MassDEP applies the Stormwater Management Standards pursuant to its authority under the Wetlands Protection Act, M.G.L. c. 131, § 40, and the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53.

The revised Stormwater Management Standards have been incorporated in the Wetlands Protection Act Regulations, 310 CMR 10.05(6)(k) and the Water Quality Certification Regulations, 314 CMR 9.06(6)(a).

MS4 – See MUNICIPAL SEPARATE STORM SEWER SYSTEM below.

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) or MUNICIPAL STORM DRAIN SYSTEM — The system designed or used for collecting or conveying stormwater, that may include any public or unaccepted streets with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drainage system owned or operated by the Town of Agawam.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER DISCHARGE PERMIT — A permit issued by United States Environmental Protection Agency or jointly with the State that regulates the discharge of pollutants to waters of the United States.

NATURAL OUTLET — Any outlet into a watercourse, pond, ditch, lake or other body of surface or ground water.

NEW DEVELOPMENT ─ Any construction activities or land alteration on a site that has not previously been altered to include buildings or impervious surfaces.

NONPOINT SOURCE POLLUTION ─ Pollution from many diffuse sources caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into water resource areas.

NON-STORMWATER DISCHARGE — Discharge which is composed of constituents which are not stormwater except as specifically exempted within the chapter.

NPDES -- See above: NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER DISCHARGE PERMIT

OPERATION AND MAINTENANCE PLAN ─ A plan that defines the functional, financial and organizational mechanisms for the ongoing operation and maintenance of the stormwater management system to ensure that it continues to function as designed.

OWNER — The owner or occupant of land, and in the case of stormwater management permit applications, any person intending to acquire an ownership interest in land. A person with a legal or equitable interest in a property.

PERMITTEE – The owner of the site in the case of stormwater management permit application.

PERMITTING AUTHORITY — See Stormwater Authority below.

PERSON — Any individual, group of individuals, firm, company, association, partnership, society, trust, estate, corporation or group, including a city, county or other governmental unit.

POINT SOURCE — Any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, or container from which pollutants are or may be discharged.

POLLUTANT — Any element or property of sewage, agricultural, industrial or commercial waste, runoff, leachate, heated effluent, or other matter, whether originating at a point or nonpoint source, that is or may be introduced into any sewage treatment works or waters of the commonwealth. Pollutants shall include, without limitation:

1. Paint, varnish, and solvents.
2. Oil, anti-freeze, and other automotive fluids.
3. Non-stormwater liquids
4. Solid wastes and yard wastes.
5. Refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordnance, accumulations and floatables.
6. Pesticides, herbicides, and fertilizers.
7. Hazardous materials and wastes.
8. Sewage, fecal coliform and pathogens.
9. Dissolved and particulate metals.
10. Animal wastes and pet wastes.
11. Rock, sand, salt and soils.
12. Construction wastes and residues.
13. Noxious or offensive matter of any kind.

RECHARGE — The process by which groundwater is replenished by precipitation through the percolation of runoff and surface water through the soil.

Commented [P2]: Should we use definition more along these lines? See also permittee below to make sure these work together. *Owner*: Every person or entity who alone, jointly or severally with others: (a) has legal title to any building, structure or parcel of land; or (b) has care, charge or control of any building, structure, or parcel of land in any capacity including but not limited to, an agent, executor, executrix, administrator, administratrix, trustee or guardian of the estate of the holder of legal title; or (c) a lessee under a written lease agreement; or (d) a mortgagee in possession; or (e) an agent, trustee or other person appointed by the courts.

Commented [P3]: Another possible better definition? *Person*: Any individual, association, partnership, corporation, company, business, organization, trust, estate, administrative agency, public or quasi-public corporation or body, the commonwealth or political subdivision thereof or the federal government, to the extent permitted by law and agent of such person.

REDEVELOPMENT – Any construction, land alteration, or improvement of impervious surfaces resulting in earth disturbances. Municipal roadway widening or improvements that increase the amount of impervious surface on the redevelopment site by greater than or equal to a single lane width shall meet the requirements for redevelopment activities.

RUNOFF – Rainfall, snowmelt, or irrigation water flowing over the ground surface.

SEDIMENT - Any mineral or organic soil material that is transported by wind or water from its origin to another location, the product of erosion processes.

SEDIMENTATION – A process of depositing material that has been suspended and transported in water.

SITE – The area extent of construction activities, including but not limited to the creation of new impervious surface and modifications to existing impervious surface, or other site alterations.

STORM DRAIN PERMIT or SD PERMIT — A permit given by the DPW to applicants which authorizes the discharge of runoff directly to the MS4 and indirectly to the waters of the Commonwealth.

STORM DRAIN (sometimes termed "storm sewer") — A sewer, ditch or channel that carries storm and surface waters, other than unpolluted cooling water. Except where the context would clearly designate one or the other, the term encompasses both underground piping and surface drainage easements containing ditches, swales, channels or detention or retention basins for the handling of water. A storm drain can be either publicly or privately owned. If publicly owned it is part of the Municipal Separate Storm Sewer System or MS4 (see definition above).

STORM DRAINAGE SYSTEM — A system by which stormwater is collected and/or conveyed. Such a system can be either publicly or privately owned. If publicly owned it is part of the Municipal Separate Storm Sewer System or MS4 (see definition above).

STORMWATER— Runoff from precipitation or snow melt.

STORMWATER AUTHORITY – The Town of Agawam Department of Public Works. The Stormwater Authority administers, implements, and enforces this Article and associated Regulations. Other Boards and/or departments may participate in the review process of Article III as defined.

STORMWATER DISCHARGE — The discharge of treated or untreated stormwater to the Town's MS4.

STORMWATER MANAGEMENT ─ The use of structural or non-structural practices that are designed to reduce stormwater runoff pollutant loads, discharge volumes, and/or peak flow discharge rates.

STORMWATER MANAGEMENT PERMIT ─ A permit issued by the Stormwater Authority, after review of an application, plans, calculations, and other supporting documents, which is designed to protect the environment of the Town from the adverse effects of uncontrolled and untreated stormwater runoff.

STORMWATER MANAGEMENT PLAN ─ A Plan to be submitted with the application for a Stormwater Management Permit, which shall include current and proposed site conditions, proposed improvements, proposed stormwater control measures, development schedules, and such other matters as may be required by the Stormwater Authority.

STOP WORK ORDER ─ An order issued which requires that all construction activity on a site be stopped.

SUPERINTENDENT — The Superintendent of Public Works of the Town of Agawam or his authorized deputy, agent or representative.

SURFACE WATER DISCHARGE PERMIT — A permit issued by the Department of Environmental Protection (DEP) pursuant to 314 CMR 3.00 that authorizes the discharge of pollutants to waters of the Commonwealth of Massachusetts.

TOXIC MATERIAL OR WASTE — See Hazardous Material or Waste above.

WASTEWATER — Any sanitary waste, sludge, or septic tank or cesspool overflow, and water that during manufacturing, cleaning or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct or waste product.

WATERCOURSE — A channel in which a flow of water occurs, either continuously or intermittently.

WATER RESOURCE — Same as "Waters of the Commonwealth."

WATERS OF THE COMMONWEALTH — All waters within the jurisdiction of the Commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, coastal waters, and groundwater. These are protected water resources through state and/or federal regulation.

YARD DRAIN — Private catch basin located within lawn area and connected to the MS4 or discharges to a dry well or indirect discharge to waters of the Commonwealth.

SECTION 3: REGULATIONS

The Superintendent of the Department of Public Works may adopt, and periodically amend rules and regulations—relating to the procedures, standards, and administration—to effectuate the purposes of this Ordinance. Failure by the Superintendent of the Department of Public Works to promulgate such rules and regulations shall not have the effect of suspending or invalidating this Ordinance.

Commented [P4]: Steve, okay for DPW Superintendent to promulgate regulations? Current Chapter 175 references public works in terms of "policies":

The Department of Public Works may adopt, and periodically amend DPW policies relevant to the administration of this chapter. These policies shall pertain to erosion and sediment control, design guidelines, materials and construction specifications and other issues related to public drainage system.

SECTION 4: ENFORCEMENT

A. Authorized Enforcement Agency

The Department of Public Works will serve as the authorized enforcement agency. The Department of Public Works or an authorized agent of the Department of Public Works shall enforce this Ordinance and any associated regulations, orders, violations notices, and enforcement orders, and may pursue all civil and criminal remedies for such violations.

B. Enforcement and Penalties

1. Criminal and Civil Relief
   a. Any person who violates any provision of this Ordinance, associated regulations, permit, notice, or order thereunder, shall be punished by a fine not to exceed $300 per violation. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

   b. The Department of Public Works may seek injunctive relief in the court of competent jurisdiction restraining the person from activities which would create further violations or compelling the person to perform abatement or remediation of

the violation.

2. Orders
   a. The Department of Public Works or an authorized agent of the Department of Public Works may issue a written order to enforce the provisions of this chapter or the regulations thereunder, which may include:
      Elimination of illicit connections or discharges to the MS4;
      Performance of monitoring, analyses, and reporting;
      Cessation of unlawful discharges, practices, activity, or operations;

      Maintenance, installation, or performance of additional erosion and sediment control measures;

      Implementation of measures to minimize the discharge of pollutants until such time as the illicit connection or discharge of pollutants shall be eliminated; and
      Remediation of contamination in connection therewith.

   If the enforcing person determines that abatement or remediation of contamination is required, the order shall set forth a deadline by which such abatement or remediation must be completed. Said order shall further provide that, should the violator or property owner fail to abate or perform remediation within the specified deadline, the Department of Public Works may, at its option, undertake such work, directly or through a contractor, and expenses thereof shall be charged to the violator.

   Within 30 days after completing all measures necessary to abate the violation or to perform remediation, the violator and the property owner will be notified of the costs incurred by the city, including administrative costs.

   The violator or property owner may file a written protest objecting to the amount or basis of costs with the Stormwater Authority within 30 days of receipt of the notification of the costs incurred. If the amount due is not received by the expiration of the time in which to file a protest or within 30 days following a decision of the Stormwater Authority affirming or reducing the costs, or from a final decision of a court of competent jurisdiction, the costs shall become a special assessment against the property owner and shall constitute a lien on the owner's property for the amount of said costs. Interest shall begin to accrue on any unpaid costs at the statutory rate provided in M.G.L. c. 59, § 57 after the 31st day at which the costs first become due.

b. Written orders shall contain the following:

- The name and address of the owner applicant;
- The address when available or the description of the building, structure, or land upon which the violation is occurring;
- A statement specifying the nature of the violation;
- A description of the remedial measures necessary to bring the development activity into compliance with this Ordinance and a time schedule for the completion of such remedial action;
- A statement of the penalty or penalties that shall or may be assessed against the person to whom the notice of violation is directed;
- a statement that the determination of violation may be appealed to the municipality by filing a written notice of appeal within thirty (30) days of service of notice of violation pursuant to the procedures of M.G.L.c.40a, §15.

3. Emergency Enforcement Action.

The Superintendent of Public Works may determine that an eminent threat to public health, safety, or the environment exists. Skipping the normal order of enforcement action may be required, including immediate suspension of access to the MS4. The Department of Public Works or designated agent may take immediate action to suspend access to the MS4 or perform actions to bring the site into compliance. The Department of Public Works has the right to bill the violator for penalty fees, reasonable costs of materials, and manpower to perform these emergency actions, and administrative costs. Within 30 days after completing all measures necessary to abate the violation or to perform remediation, the violator and the property owner shall be notified of the costs incurred by the Town, including administrative costs. The violator or property owner may file a written protest objecting to the amount or basis of costs with the Department of Public Works within 30 days of receipt of the notification of the costs incurred.

Any bills sent to violators which remain unpaid for a time period of 30 days, or the time in which to protest, or within 30 days following a decision by the Department of Public Works affirming or reducing the costs, or from a final decision of a court of competent jurisdiction, the costs shall become a lien against the property until paid.

4. Restoration of Land

Any violator may be required to restore land to its undisturbed condition. In the event that restoration is not undertaken within a reasonable time after notice, the Department of Public Works, or its designated agent, may take necessary corrective action, the cost of which shall become a lien upon the property until paid.

5. Hold on Certificate of Occupancy and/or Storm Drain Permit

For development or redevelopment projects, a certificate of occupancy will not be granted until corrections to all stormwater practices have been made and accepted by the Department of Public Works.

No new Department of Public Works storm drain permits will be issued to owners or contractors that have enforcement orders currently in effect against any project. The hold will be released once all remediation work is complete and approved by Department of Public Works.

6. Stop-work Orders

The Department of Public Works may issue stop-work orders on any project which is found in violation of the storm drain permit or this chapter until adequate corrective action is complete to the satisfaction of the Department of Public Works.

Persons receiving a notice of violations will be required to halt all construction activities. This "stop work order" will be in effect until the Department of Public Works confirms that the development activity is in compliance and the violation has been satisfactorily addressed. Failure to address a notice of violation in a timely manner can result in civil, criminal, or monetary penalties in accordance with the enforcement measures authorized in this Ordinance. The Department of Public Works may utilize the services of a Massachusetts registered engineer to verify compliance at the Applicant's expense.

7. Noncriminal Disposition

As an alternative to criminal prosecution or civil action, the Town of Agawam may elect to utilize the noncriminal disposition procedure set forth in MGL c. 40, § 21D, in which case the Town of Agawam Superintendent of Public Works, or his/ her designee shall be the enforcing person. The penalty for the first violation shall be a warning. The penalty for the second violation shall be $100. The penalty for the third and subsequent violations shall be $300. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

Commented [P5]: Tiering here based on state model bylaw.

8. Entry to Perform Duties Under this Chapter

To the extent permitted by state law, or if authorized by the owner or other party in control of the property, the Town of Agawam, the Superintendent of Public Works or his/her designee, its agents, officers, and employees may enter upon privately owned property for the purpose of performing their duties under this chapter and regulations and may make or cause to be made such examinations,

surveys or sampling as deemed reasonably necessary.

9. Appeals

The decisions or orders of the Superintendent of Public Works shall be final. Further relief shall be to a court of competent jurisdiction.

10. Remedies Not Exclusive.

The remedies listed in this chapter are not exclusive of any other remedies available under any applicable federal, state or local law.

SECTION 5: SEVERABILITY

The provisions of this Article are hereby declared to be severable. If any provision, paragraph, sentence, or clause of this Ordinance or the application thereof to any person, establishment, or circumstances shall be held invalid, such invalidity shall not affect any other provisions or applications of this Ordinance, and shall continue in full force and effect.

SECTION 6. TRANSITIONAL PROVISIONS

Property owners shall have 90 days from the effective date of the Ordinance to comply with its provisions provided good cause is shown for the failure to comply with the Ordinance during that period unless local, state, or federal agencies deem that immediate actions are warranted

ARTICLE II
ILLICIT CONNECTIONS AND DISCHARGES

SECTION 1: PURPOSE

A. Purpose
The purpose of this Article is to regulate illicit connections and discharges to the storm drain system, which is necessary for the protection of the Town of Agawam's water bodies, wetlands, and groundwater, and to safeguard the public health, safety, welfare and the environment.

The objectives of this Article are:

(1) To prevent pollutants from entering the municipal separate storm sewer system;
(2) To prohibit illicit connections and unauthorized discharges to the stormwater system;
(3) To require the removal of all such illicit connections;
(4) To comply with state and federal statutes and regulations relating to stormwater discharges;
(5) To establish the legal authority to ensure compliance with the provisions of this Article through inspection, monitoring, and enforcement.

Increased and contaminated stormwater runoff are major causes of:

(1) Impairment of water quality and flow in lakes, ponds, streams, rivers, wetlands and groundwater;
(2) Contamination of drinking water supplies;
(3) Alteration or destruction of aquatic and wildlife habitat; and
(4) Local flooding.

SECTION 2: APPLICABILITY

This Article shall apply to all flows entering the storm drain system owned and operated by the Town of Agawam.

For permitted connection to the MS4, see Article III in this Chapter.

SECTION 3: PROHIBITED ACTIVITIES

A. Obstruction of the MS4
No person shall obstruct or interfere with the normal flow of stormwater into or out of the municipal storm drain system without prior written approval from the Superintendent.

B. Illicit connection
No person shall construct, use, allow, maintain or continue any illicit connection to the MS4, regardless of whether the connection was permissible under applicable law, regulation or custom at the time of connection. No grandfathering is permitted.

C. Connections
No one shall tie any pump, cellar, yard, roof or area drain directly into the municipal storm drain system without written approval from the Superintendent of the Department of Public Works.

It is prohibited for anyone with a private drainage system from tying into the public storm drain system without written approval from the Superintendent of the Department of Public Works. The maintenance of any and all private drainage systems up to the point of connection to the municipal system shall be the responsibility of the owners.

The Superintendent of the Department of Public Works reserves the right to rescind permission of a connection to the municipal storm drain system if it deems the private drainage system is not properly maintained.

D. Prohibited discharges to storm drain system
No person shall dump, discharge, cause or allow to be discharged any pollutant or non-stormwater discharge into the municipal separate storm sewer system (MS4). Examples of illicit discharges include, but are not limited to, antifreeze, motor oil, pesticides, cleaning products, pet wastes, concentrated fertilizers, concentrated herbicides, bleach, concrete wash water, sediment laden construction runoff.

Catch Basins - No Person shall directly or indirectly dump, discharge or cause or allow to be discharged into any catch basin, any solid waste, construction debris, paint or paint product, antifreeze, hazardous waste, oil, gasoline, grease and all other automotive and petroleum products, solvents and degreasers, drain cleaners, commercial or household cleaners, soap, detergent, ammonia, food and food waste, grease or yard waste, animal feces, dirt, sand gravel or other pollutant. Any person determined by the applicable authority to be responsible for the discharge of any of the above substances to a catch basin may be held responsible for cleaning the catch basin and any other portions of the storm water system impacted according to Town standards and requirements or paying the cost for such cleaning. In addition, the Person shall be responsible for paying any penalties assessed by the Town.

Septage - No person shall discharge or cause or allow to be discharged any septage, or septage tank or cesspool overflow into the Town's storm drain system.

Storage & Disposal of Hazardous Material – No one shall dispose of anything other than clear water into the Town's storm drain system. The disposal of waste, gasoline or any other hazardous material into the storm drain system is strictly prohibited and is in violation of state and federal pollution laws.

Discharge of unpolluted drainage -- Stormwater and all other unpolluted drainage shall be discharged to an appropriate stormwater management best management practice or natural outlet. If no such outlet is available, such unpolluted wastes may be discharged into the sanitary sewers or storm sewers if approved by the Department of Public Works Superintendent.

Waters contaminated with silt and sediment – No waters contaminated with silts or sediment shall be discharged into a watercourse, detention area or storm drain.

E. Exemptions

1. Emergency activities that are immediately necessary for the protection of life, property or the environment as determined by the Department of Public Works, Police Department, or Fire Department.
2. Roadway maintenance activities essential to public health and safety.
3. The following non-stormwater discharges or flows are exempt, provided that the source is not a significant contributor of a pollutant to the municipal storm drain system:
    a) Municipal waterline flushing.
    b) Flow from potable water sources.
    c) Springs.
    d) Natural flow from riparian habitats and wetlands.
    e) Diverted stream flow.
    f) Rising groundwater.
    g) AC condensation
    h) Water from crawl space pumps
    i) Footing drains
    j) Residential building wash waters without detergents
    k) Uncontaminated groundwater infiltration as defined in 40 CFR 35 2005(20), or uncontaminated pumped groundwater.
    l) Water from exterior foundation drains
    m) Discharge from landscape irrigation or lawn watering.
    n) Water from individual residential car washing
    o) Discharge from dechlorinated swimming pool water (less than one ppm chlorine), provided that the water is allowed to stand for one week prior to draining and the pool is drained in such a way as not to cause a

nuisance.

p) Discharge from street sweeping.
q) Dye testing, provided that verbal notification is given to the Superintendent of the Department of Public Works prior to the time of the test.
r) Non-stormwater discharge permitted under an NPDES permit or a surface water discharge permit, waiver, or waste discharge order administered under the authority of the United States Environmental Protection Agency or the Department of Environmental Protection, provided that the discharge is in full compliance with the requirements of the permit, waiver, or order and applicable laws and regulations.
s) Discharge for which advanced written approval is received from the Superintendent as necessary to protect public health, safety, welfare or the environment.
t) Agricultural activities for normal maintenance or improvement of land as defined by the Massachusetts Wetlands Protection Act 310 CMR 10.04 and other implementing regulations as appropriate. Activities not exempted include spill of materials onto roadways from hauling agricultural products or fertilizers.

SECTION 4: EMERGENCY SUSPENSION OF STORM DRAIN SYSTEM

The Superintendent of the Department of Public Works or designated representative may suspend storm drain system access to any person or property without prior written notice when such suspension is necessary to stop an actual or threatened illegal discharge that presents or may present imminent risk of harm to the public health, safety, welfare or the environment. In the event any person fails to comply with an emergency suspension order, the Superintendent of the Department of Public Works or designated representative may take all reasonable steps to prevent or minimize harm to the public health, safety, welfare or the environment.

SECTION 5: WATERCOURSE PROTECTION

Commented [P6]: This is not required by MS4 permit, but DPW opted to add with some changes as shown.

Every person owning property through which a watercourse passes, or such person's lessee, shall keep and maintain that part of the watercourse within the property free of trash, debris, and other obstacles that would pollute, contaminate, or significantly retard the flow of water through the watercourse. In addition, the owner or lessee shall maintain existing privately owned structures within or adjacent to a watercourse so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse.

Failure by the property owner to maintain the watercourse does not constitute an obligation on the part of the Town to assume this responsibility.

Where a privately owned drainage structure is failing, the Town has the option to step in and perform emergency repairs as may be necessary. The owner will be billed and must pay for costs to repair the structure.

Commented [P7]: Property owner likely due some notice prior to Town making repairs. Steve, what is best language to use here?

SECTION 6: NOTIFICATION OF SPILLS

Notwithstanding other requirements of local, state or federal law, as soon as a person responsible for a facility or operation, or responsible for emergency response for a facility or operation, has information of or suspects a release of materials at that facility or operation resulting in or which may result in discharge of pollutants to the municipal drainage system, the person shall take all necessary steps to ensure containment and cleanup of the release. In the event of a release of oil or hazardous materials, the person shall immediately notify the municipal fire and police departments and Department of Public Works. In the event of a release of nonhazardous material, the reporting person shall notify the Department of Public Works no later than the next business day. The reporting person shall provide to the Department of Public Works written confirmation of all telephone, facsimile or in-person notifications within three business days thereafter. If the discharge of prohibited materials is from a commercial or industrial facility, the facility owner or operator of the facility shall retain on-site a written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

ARTICLE III
STORMWATER MANAGEMENT PERMIT

SECTION 1: PURPOSE

A. Purpose

1. The purpose of this Article is to better manage land development in order to protect, maintain, and enhance the public health, safety, and general welfare of the citizens of Agawam by establishing minimum requirements and procedures to control the adverse impacts associated with stormwater runoff from new development and redevelopment.

2. The proper management of stormwater runoff will meet the following objectives:
   a) Establish regulations for land development activities that preserve the health of water resources by reducing the adverse water quality impacts from stormwater discharges to rivers, lakes, reservoirs, and streams in order to attain federal water quality standards;
   b) Require that new development, redevelopment, and all land conversion activities maintain the natural hydrologic characteristics of the land and treat for water quality in order to: reduce flooding, stream bank erosion, siltation, nonpoint source pollution, property damage, and to maintain the integrity of stream channels and aquatic habitats;
   c) Prevent the discharge of pollutants, including hazardous chemicals, into stormwater runoff;
   d) Minimize the volume and rate of stormwater discharges to rivers, streams, reservoirs, lakes and ponds during and following development activities;
   e) Prevent erosion and sedimentation from land development, and reduce stream channel erosion caused by increased runoff;
   f) Provide for the recharge of groundwater aquifers and maintain the base flow of streams;
   g) Advance the use of Low Impact Development and Better Site Design practices such as limiting disturbance, reducing impervious surface, treating and infiltrating stormwater at the source, using environmentally sensitive site design, and the preservation of open space and other natural areas;
   h) Provide stormwater facilities that are attractive, maintain the natural integrity of the environment, and are designed to protect public safety;
   i) Establish maintenance provisions to ensure that stormwater treatment practices will continue to function as designed over the long term.

3. This Ordinance and its associated Regulations are also intended to bring Agawam into

compliance with requirements in the United States Environmental Protection Agency National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts ("Massachusetts Small MS4 General Permit")

SECTION 2: APPLICABILITY

A. Administrative Review or Permit

No person may initiate a construction activity or land disturbance, including clearing, grubbing, land grading, earth moving, or other development or redevelopment activities that results in the disturbance of land in excess of the thresholds described below without Administrative Review for Stormwater Management or approval or waiver of the requirement for a Stormwater Management Permit by the Town's Stormwater Authority.

1. Administrative Review for Stormwater Management is required for new development or redevelopment projects that will create, individually or part of a common plan of development or sale, between 5,000 and up to but not including 43,560 square feet of disturbance.

2. A Stormwater Management Permit is required for new development or redevelopment projects that will disturb 1 acre (43,560 square feet) or more of land or create 5,000 square feet or more of impervious cover. This includes construction activities for new development or redevelopment that disturb less than one acre if that disturbance is part of a larger common plan of development or sale that all together disturbs one or more acres.

Notwithstanding any exemption provided for below, any alteration, redevelopment, or conversion of land use to a "land use with higher potential pollutant loads" as defined in the most recent version of the Massachusetts Stormwater Handbook, such as auto salvage yards, auto fueling facilities, fleet storage yards, commercial parking lots, and other potential water quality concerns shall require a Stormwater Management Permit.

B. Exemptions

The following use and activities are exempt from the requirements for Administrative Review for Stormwater Management or a Stormwater Management Permit. All exempt uses and activities must still comply with the purposes and the performance standards described in the accompanying Regulations. Failure of an exempt activity to comply with the purposes and performance standards described in the associated Regulations shall be interpreted as a violation and exempt status revoked. Note that changes at a site may not be split or phased

in order to use this exemption repeatedly.

1. Any agricultural activity that is consistent with an approved soil conservation plan prepared or approved by the Natural Resources Conservation Service

2. Any logging that is consistent with a Forest Cutting Plan approved under the Forest Cutting Practices Act by the Massachusetts Department of Conservation and Recreation;

3. Activities that are exclusively limited to maintenance and improvement of existing sidewalks, municipal roadways (including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving projects). Note that roadway widening or improvements that increase the amount of impervious surface area on the redevelopment site by greater than or equal to a single lane width are subject to the requirements of this Article and associated Regulations.

4. Repairs to any stormwater treatment system deemed necessary by the Department of Public Works.

5. Any emergency activity that is immediately necessary for the protection of life, property or the environment, as determined by the Department of Public Works, Board of Health or Police and Fire.

SECTION 3: ADMINISTRATION

A. Responsibility

As the Stormwater Authority, the Department of Public Works shall administer, implement and enforce this Article. Any powers granted to or duties imposed upon the Department of Public Works may be delegated in writing by the Superintendent of Public Works to employees or agents of the Department of Public Works.

The Department of Public Works may also designate Town Boards, including (but not limited to) the Planning Board, Zoning Board of Appeals, Conservation Commission, and the Board of Health, and/or their agents to review permit applications within the designated Board's expertise (the "Reviewing Board") and to make recommendations to the Department of Public Works. Such review shall follow the standards and criteria contained in the associated Regulations. Projects or activities approved by the Department of Public Works shall be deemed in compliance with the intent and provisions of this Ordinance and

associated Regulations.

B. Fees

The Department of Public Works may establish a permit review fee schedule, based on the type and complexity of projects, and may update this fee as needed, and implement with approval of the City Council, to cover the costs of permit administration for Stormwater Management Permits.

Commented [P8]: Steve, assuming this is role for City Council. Correct?

The Stormwater Authority is authorized to retain a Registered Professional Engineer (PE) or other professional consultant to advise the Stormwater Authority on any or all aspects of the application and/or the project's compliance with conditions of a Review or Permit. The Stormwater Authority may require the applicant to pay reasonable costs to be incurred by the Stormwater Authority for the employment of outside consultants pursuant to Stormwater Authority regulations as authorized by M.G.L. c. 44, § 53G.

C. Coordination with Other Required Permits

Projects undergoing permitting under site plan review under the Zoning Bylaw (Chapter 180) or under the Subdivision Regulations (Chapter 159) that also require a stormwater management and erosion control permit, shall submit drainage reports, stormwater management plan, and erosion and sediment control plan, construction drawings, specifications, operation and maintenance plan, and as-built information in accordance with this Article and associated Regulations.

For projects where stormwater discharges are subject to jurisdiction of the Wetlands Protection Act, the Conservation Commission will include the Department of Public Works in the application review process. An Order of Conditions issued by the Conservation Commission that demonstrates a project's compliance with the Massachusetts Stormwater Management Standards and the MS4 permit standards within this Ordinance and associated Regulations will serve as the Stormwater Management Permit.

D. Inspection and Site Supervision

The Stormwater Authority or its designated agent shall require inspections to verify and document compliance with the Administrative Review for Stormwater Management or Stormwater Management Permit.

E. Waivers

The Stormwater Authority, or its authorized agent, may waive strict compliance with any requirement of this Ordinance or associated Regulations promulgated hereunder, where such action is:

(1) allowed by federal, state and local statutes and/or regulations; and

(2) in the public interest; and
(3) not inconsistent with the purpose and intent of this Ordinance.

Any person seeking a waiver must submit a written waiver request. Such a request shall be accompanied by an explanation or documentation supporting the waiver request and demonstrating that strict application of the Ordinance does not further the purposes or objectives of this Ordinance.

All waiver requests shall require a public hearing.

If in the opinion of the Stormwater Authority or its authorized agent, additional time or information is required for review of a waiver request, the Stormwater Authority may continue a hearing to a date certain announced at the meeting. In the event the applicant objects to a continuance, or fails to provide requested information, the waiver request shall be denied.

REGULATIONS FOR STORMWATER MANAGEMENT PERMIT
DRAFT 5-4-21

Section 1: Purpose and Authority

Section 2: Definitions

Section 3: Applicability

Section 4: Administration

Section 5: Application Requirements and Procedures

Section 6: Performance Standards

Section 7: Plan Requirements

Section 8: Surety

Section 9: Inspection and Site Supervision

Section 10: Right of Entry

Section 11: As-Built Drawings

Section 12: Final Submissions and Certificate of Completion

Section 13: Enforcement

Section 14: Severability

SECTION 1: PURPOSE AND AUTHORITY

A. Purpose

Commented [P1]: Same as Chapter 176, Article III, Section 1

1. The purpose of these Regulations and the Associated Ordinance is to better manage land development in order to protect, maintain, and enhance the public health, safety, and general welfare of the citizens of Agawam by establishing minimum requirements and procedures to control the adverse impacts associated with stormwater runoff from new development and redevelopment.

2. The proper management of stormwater runoff will meet the following objectives:
   a) Establish regulations for land development activities that preserve the health of water resources by reducing the adverse water quality impacts from stormwater discharges to rivers, lakes, reservoirs, and streams in order to attain federal water quality standards;
   b) Require that new development, redevelopment, and all land conversion activities maintain the natural hydrologic characteristics of the land and treat for water quality in order to: reduce flooding, stream bank erosion, siltation, nonpoint source pollution, property damage, and to maintain the integrity of stream channels and aquatic habitats;
   c) Prevent the discharge of pollutants, including hazardous chemicals, into stormwater runoff;
   d) Minimize the volume and rate of stormwater discharges to rivers, streams, reservoirs, lakes and ponds during and following development activities;
   e) Prevent erosion and sedimentation from land development, and reduce stream channel erosion caused by increased runoff;
   f) Provide for the recharge of groundwater aquifers and maintain the base flow of streams;
   g) Advance the use of Low Impact Development and Better Site Design practices such as limiting disturbance, reducing impervious surface, treating and infiltrating stormwater at the source, using environmentally sensitive site design, and the preservation of open space and other natural areas;
   h) Provide stormwater facilities that are attractive, maintain the natural integrity of the environment, and are designed to protect public safety;
   i) Establish maintenance provisions to ensure that stormwater treatment practices will continue to function as designed over the long term.

3. This Bylaw and its associated Regulations are also intended to bring Agawam into compliance with requirements in the United States Environmental Protection Agency National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in

Massachusetts (“Massachusetts Small MS4 General Permit”)

B. Authority

These Regulations are adopted under the Authority of Chapter 176 of the Town of Agawam Code of Ordinances, which is further authorized by the Home Rule Amendment of the Massachusetts Constitution and the Home Rule Procedures Act, and pursuant to the regulations of the Federal Clean Water Act found at 40 CFR 122:34.

The Superintendent of the Department of Public Works or designated representative shall administer, implement and enforce these Regulations. Any powers granted to or duties imposed upon the Superintendent of the Department of Public Works may be delegated in writing by the Superintendent of the Department of Public Works to employees or agents of the Department of Public Works.

Commented [P2]: Authority essentially pulled from Chapter 176, Article 1, Section 1, with slight modifications based on these being Regulations.

SECTION 2: DEFINITIONS

Commented [P3]: This is based on definitions in new Chapter 176, Article 1, Section 2, but expanded to include additional definitions (in yellow highlight) given the more detail provided in regulations.

Also removed several definitions not used within Regulations:
Active Groundwater Dewatering Device
Illicit Stormwater Discharge
Natural Outlet
Surface Water Discharge Permit

Word usage

"Shall" is mandatory; "may" is permissive.

Definitions

Unless the context specifically indicates otherwise, the meanings of terms used in this chapter shall be as follows:

ABUTTER — One who holds title to real property within the limits of an improvement area, and his successors in title**.**

ACRE ― A unit of land equal to 43,560 square feet.

ALTER ― Any activity that will measurably change the ability of a ground surface area to absorb water or will change existing surface drainage patterns. Alter may be similarly represented as “alteration of drainage characteristics,” and “conducting land disturbance activities.”

AGRICULTURAL ACTIVITY ― Producing or raising one or more of the following agricultural commodities for commercial purposes:

1. animals, including but not limited to livestock, poultry, and bees;
2. fruits, vegetables, berries, nuts, maple sap, and other foods for human consumption; and
3. feed, seed, forage, tobacco, flowers, sod, nursery or greenhouse products, and ornamental plants or shrubs.

and as further defined by the Massachusetts Wetlands Protection Act and its implementing regulations.

and as further defined by the Massachusetts Wetlands Protection Act and its implementing regulations.

APPLICANT — A property owner or agent of a property owner who has filed an application for a Stormwater Management Permit.

AS-BUILT DRAWING: Drawings that completely record and document applicable aspects and features of conditions of a project following construction using Stormwater Management Plans derived from a Stormwater Management Permit.

AUTHORIZED ENFORCEMENT AGENCY — The Department of Public Works, its employees, or agents designated to enforce this chapter on behalf of the Superintendent**.**

BEST MANAGEMENT PRACTICES (BMPs) — Structural, nonstructural, and managerial techniques that are recognized to be the most effective and practical means to prevent and/or reduce increases in stormwater volumes and flows, reduce point source and nonpoint source pollution, and promote stormwater quality and protection of the environment. “Structural” BMPs are devices that are engineered and constructed to provide temporary storage and treatment of stormwater runoff. “Nonstructural” BMPs use natural measures to reduce pollution levels, do not require extensive construction efforts, and/or promote pollutant reduction by eliminating the pollutant source.

BETTER SITE DESIGN ─ Site design approaches and techniques that can reduce a development’s impact on the watershed through the use of nonstructural stormwater management practices. Better site design includes conserving and protecting natural areas and green space, reducing the area of impervious surface, and using natural features for stormwater management.

CERTIFICATE OF COMPLETION (COC) ─ A document issued by the Department of Public Works after all construction activities have been completed, which states that all conditions of an issued Stormwater Management Permit have been met and that a project has been completed in compliance with the conditions set forth in a Stormwater Management Permit.

CLEAN WATER ACT — The federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

COLDWATER FISH RESOURCE – A waterbody (stream, river, or tributary thereto) used by reproducing coldwater fish to meet one or more of their life history requirements. CFRs are particularly sensitive habitats. Changes in land and water use can reduce the ability of these waters to support trout and other kinds of coldwater fish. Massachusetts Division of Fisheries and Wildlife identify coldwater fish resources based on fish samples collected annually by staff biologists and technicians. The Division of Fisheries and Wildlife maintains a list of waters that are identified as Coldwater Fish Resources (CFR) and an associated map layer.

COMMON PLAN OF DEVELOPMENT OR SALE - A contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan.

CONSTRUCTION ACTIVITY — Disturbance of a site for the purpose of constructing buildings, structures, other areas of impervious surface, and site alterations for other purposes including the disturbance of the ground by removal or moving of vegetative surface cover or topsoil, grading, excavation, clearing or filling.

CONVEYANCE — Any structure or device, including pipes, drains, culverts, curb breaks, paved swales or man-made swales of all types designed or utilized to move or direct stormwater runoff or existing water flow.

DEP or DEPARTMENT OF ENVIRONMENTAL PROTECTION — A department of the Commonwealth of Massachusetts which regulates environmental concerns, including but not limited to the Wetland Protection Act and as co-permittee-of certain NPDES permits with the EPA.

DPW or DEPARTMENT OF PUBLIC WORKS — The administrative body for public works in the Town of Agawam.

DESIGN STORM — A rainfall event of specified size and return frequency that is used to calculate the runoff volume and peak discharge/runoff rate to a control point such as a BMP.

DETENTION — The temporary storage of storm runoff in a BMP, which is used to control the peak discharge/runoff rates, and which provides settling of pollutants.

DISCHARGE — The following are the definitions of terms used in this section:

1. DIRECT STORMWATER DISCHARGE — The discharge of treated or untreated stormwater directly to the MS4, which may or may not subsequently discharge to the waters of the Commonwealth of Massachusetts, including rivers, streams, brooks, or wetlands.

2. ILLICIT STORMWATER DISCHARGE — Any non-stormwater discharge into the municipal separate storm sewer system (MS4), except as specifically exempted in this code. Discharges which are in compliance with a NPDES stormwater discharge permit are not illicit discharges.
3. INDIRECT STORMWATER DISCHARGE — The discharge of treated or untreated stormwater to the waters of the Commonwealth of Massachusetts, including rivers, streams, brooks, or wetlands, without a connection to or discharge to the municipal separate storm sewer system (MS4) before flows reach the water resource.
4. STORMWATER DISCHARGE — The discharge of treated or untreated stormwater to the Town's MS4.
5. DISCHARGE OF POLLUTANTS — The addition from any source of any pollutant or combination of pollutants into the municipal storm drain system or into the waters of the United States or Commonwealth from any source.

DISTURBANCE — Any land clearing, grading, bulldozing, digging or similar activities.

DRAINAGE AREA — That area contributing stormwater runoff to a single point measured in a horizontal plane, which is enclosed by a ridgeline or other topographic divide.

EASEMENT — See drainage easement.

DRAINAGE EASEMENT – A legal right granted by a landowner to a grantee allowing the use of private land for stormwater management purposes.

DRAINAGE SYSTEM — Same as stormwater system, storm sewer system.

DRAIN LATERAL OR CONNECTION — Drainage service connections are private structures to be owned and maintained by the property owner to the point where it connects to a stormwater main, manhole, or catch basin in the street right-of-way or Town's easement.

DUMPING — An act or omission of any person or entity, the proximate result of which is the introduction of pollutant(s) to the MS4, which is an illicit discharge.

ENVIRONMENTALLY SENSITIVE SITE DESIGN — Site planning and layout that seeks to create pockets of development that avoid sensitive natural areas to prevent disruption of the natural hydrology and habitat function of the site.

EPA or ENVIRONMENTAL PROTECTION AGENCY — The United States Environmental Protection Agency, a department of the federal government that requires compliance with the Clean Water Act and NPDES permitting.

EROSION – The wearing away of the land surface by natural or artificial forces, such as wind, water, ice, gravity, or vehicle traffic, and subsequent detachment and transportation of soil particles.

EROSION CONTROL ─ The prevention or reduction of the movement of soil particles or rock fragments.

EROSION AND SEDIMENT CONTROL PLAN ─ Is a document containing narrative, drawings and details—developed by a qualified professional engineer (PE) or a certified professional in erosion and sedimentation control (CPESC) — that includes best management practices or equivalent measures designed to control surface runoff, erosion, and sedimentation during construction and construction-related land disturbance activities.

EXISTING DISCHARGE — Any discharge to the MS4 which is under construction or operation at the time of the enactment of this definition.

FLOOD CONTROL ─ The prevention or reduction of flooding and flood damage.

FLOODING ─ A local and temporary inundation or a rise in the surface of a body of water, such that it covers land not usually under water.

FOREST CUTTING PLAN ─ A plan for the cutting of trees on forest land, which is prepared and submitted in accordance with M.G.L. Chapter 132 Sections 40 - 46A. The forest cutting plan requires approval by a Service Forester of the Massachusetts Department of Conservation and Recreation, as provided under 304 CMR 11.04.

GRADING ─ Changing the level or shape of the ground surface.

GROUNDWATER ─ All water beneath any land surface including water in the soil and bedrock beneath water bodies, but not including water in manmade structures.

GROUNDWATER RECHARGE — The process by which groundwater is replenished by precipitation through the percolation of runoff and surface water through the soil.

GRUBBING – The act of clearing land surface by digging up roots and stumps.

HAZARDOUS MATERIAL OR WASTE – Any material, which because of its quantity, concentration, chemical, corrosive, flammable, reactive, toxic, infectious or radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential threat to human health, safety, welfare, or to the

environment. Toxic or hazardous materials include any synthetic organic chemical, petroleum product, heavy metal, radioactive or infectious waste, acid and alkali, and any substance defined as Toxic or Hazardous under M.G.L. Ch.21C and Ch.21E, and the regulations at 310 CMR 30.000 and 310 CMR 40.0000.

LAND USE WITH HIGHER POTENTIAL POLLUTANT LOAD (LUHPPL) – Land uses such as auto salvage yards, auto fueling facilities, exterior fleet storage yards, vehicle service and equipment cleaning areas, commercial parking lots with high intensity use, road salt storage areas, outdoor storage and loading areas of hazardous substances, confined disposal facilities and disposal sites, marinas, boat yards, or other uses identified by the Massachusetts Stormwater Handbook.

ILLICIT CONNECTION — Any surface flow or conveyance of flows to the MS4 which contains non-stormwater discharges except as exempted within this chapter.

IMPERVIOUS SURFACE – Any material or structure on or above the ground that reduces the infiltrating capacity of soils or prevents water from infiltrating through the underlying soil. Impervious surface is defined to include, without limitation: paved parking lots and roads, rooftops, driveways, patios, and other paved and gravel surfaces.

IMPROVEMENT AREA — The area served by the proposed drainage project, the boundaries of which shall include only those parcels or portions of parcels that could be directly connected to the proposed common sewers or drains, such that a building sewer or drain would not have to pass through adjacent private land to serve each parcel.

INDIRECT STORMWATER DISCHARGE — The discharge of treated or untreated stormwater to the waters of the Commonwealth of Massachusetts, including rivers, streams, brooks, or wetlands without a connection to or discharge to the municipal separate storm sewer system (MS4) before flows reach the water resource.

INFILTRATION – The downward movement of water from the surface to the subsoil so as to permit groundwater recharge and the reduction of stormwater runoff from a project site.

LOW IMPACT DEVELOPMENT (LID) – A development strategy that seeks to mimic (or in the case of redevelopment, restore/recreate) a site's predevelopment hydrology through protection of on-site natural features and better site design that limits impervious areas, preserves open space, and uses decentralized small scale facilities to capture and manage rainfall (or snowmelt) close to where it falls. These small-scale facilities serve to slow, absorb, and treat flow and include bioretention areas, grassed swales, porous pavements, cisterns, and green roofs and walls.

MASSACHUSETTS STORMWATER HANDBOOK AND STORMWATER STANDARDS ─ The guidance issued by MassDEP, and as amended, that coordinates the requirements prescribed by state regulations promulgated under the authority of the Massachusetts Wetlands Protection Act G.L. c. 131 § 40 and Massachusetts Clean Waters Act G.L. c. 21, §. 23-56. The Handbook and Standards addresses stormwater impacts through implementation of performance standards to promote increased stormwater recharge, the treatment of more runoff from polluting land uses, low impact development (LID) techniques, pollution prevention, the removal of illicit discharges to stormwater management systems, and improved operation and maintenance of stormwater best management practices (BMPs). MassDEP applies the Stormwater Management Standards pursuant to its authority under the Wetlands Protection Act, M.G.L. c. 131, § 40, and the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53. The revised Stormwater Management Standards have been incorporated in the Wetlands Protection Act Regulations, 310 CMR 10.05(6)(k) and the Water Quality Certification Regulations, 314 CMR 9.06(6)(a).

MS4 – See MUNICIPAL SEPARATE STORM SEWER SYSTEM below.

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) or MUNICIPAL STORM DRAIN SYSTEM — The system designed or used for collecting or conveying stormwater, that may include any public or unaccepted streets with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drainage system owned or operated by the Town of Agawam.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER DISCHARGE PERMIT — A permit issued by United States Environmental Protection Agency or jointly with the State that regulates the discharge of pollutants to waters of the United States.

NEW DEVELOPMENT ─ Any construction activities or land alteration on a site that has not previously been altered to include buildings or impervious surfaces.

NONPOINT SOURCE POLLUTION ─ Pollution from many diffuse sources caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into water resource areas.

NON-STORMWATER DISCHARGE — Discharge which is composed of constituents which are not stormwater except as specifically exempted within the chapter.

NPDES -- See above: NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER DISCHARGE PERMIT

OPERATION AND MAINTENANCE PLAN – A plan that defines the functional, financial and organizational mechanisms for the ongoing operation and maintenance of the stormwater management system to ensure that it continues to function as designed.

OWNER — The owner or occupant of land, and in the case of stormwater management permit applications, any person intending to acquire an ownership interest in land. A person with a legal or equitable interest in a property.

PEAK DISCHARGE / RUNOFF — The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event.

PERMEABLE SOILS — Soils with a sufficiently rapid infiltration rate so as to reduce or eliminate stormwater runoff. The permeability of soils are generally classified by NRCS hydrologic soil types A, B, C, and D ranging from most permeable to least permeable.

PERMITTEE – The owner of the site.

PERMITTING AUTHORITY — See Stormwater Authority below.

PERSON — Any individual, group of individuals, firm, company, association, partnership, society, trust, estate, corporation or group, including a city, county or other governmental unit.

POINT SOURCE – Any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, or container from which pollutants are or may be discharged.

POLLUTANT — Any element or property of sewage, agricultural, industrial or commercial waste, runoff, leachate, heated effluent, or other matter, whether originating at a point or nonpoint source, that is or may be introduced into any sewage treatment works or waters of the commonwealth. Pollutants shall include, without limitation:

1. Paint, varnish, and solvents.
2. Oil, anti-freeze, and other automotive fluids.
3. Non-stormwater liquids
4. Solid wastes and yard wastes.
5. Refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordnance,

Commented [P4]: Should we use definition more along these lines? See also permittee below to make sure these work together. *Owner*: Every person or entity who alone, jointly or severally with others: (a) has legal title to any building, structure or parcel of land; or (b) has care, charge or control of any building, structure, or parcel of land in any capacity including but not limited to, an agent, executor, executrix, administrator, administratrix, trustee or guardian of the estate of the holder of legal title; or (c) a lessee under a written lease agreement; or (d) a mortgagee in possession; or (e) an agent, trustee or other person appointed by the courts.

Commented [P5]: Another possible better definition? *Person*: Any individual, association, partnership, corporation, company, business, organization, trust, estate, administrative agency, public or quasi-public corporation or body, the commonwealth or political subdivision thereof or the federal government, to the extent permitted by law and agent of such person.

accumulations and floatables.
6. Pesticides, herbicides, and fertilizers.
7. Hazardous materials and wastes.
8. Sewage, fecal coliform and pathogens.
9. Dissolved and particulate metals.
10. Animal wastes and pet wastes.
11. Rock, sand, salt and soils.
12. Construction wastes and residues.
13. Noxious or offensive matter of any kind.

POST-CONSTRUCTION —The state of a site after development-related construction activity is complete.

POST-CONSTRUCTION IMPERVIOUS SURFACE — Is the final impervious cover on the portion of the property where construction activities have occurred.

PRE-CONSTRUCTION — The state of a site prior to development. The pre-development state shall be interpreted as the state of a site at the time of permitting for a redevelopment project.

RECHARGE — The process by which groundwater is replenished by precipitation through the percolation of runoff and surface water through the soil.

REDEVELOPMENT ─ Any construction, land alteration, or improvement of impervious surfaces resulting in earth disturbances. Municipal roadway widening or improvements that increase the amount of impervious surface on the redevelopment site by greater than or equal to a single lane width shall meet the requirements for redevelopment activities.

RIPARIAN BUFFER - Also known as a vegetated buffer or forest buffers, riparian buffers are vegetated areas along a stream, usually forested, which helps shade and partially protect a stream from the impact of adjacent land uses.

RUNOFF ─ Rainfall, snowmelt, or irrigation water flowing over the ground surface.

SEDIMENT - Any mineral or organic soil material that is transported by wind or water from its origin to another location, the product of erosion processes.

SEDIMENTATION ─ A process of depositing material that has been suspended and transported in water.

SITE ─ The area extent of construction activities, including but not limited to the creation of

new impervious surface and modifications to existing impervious surface, or other site alterations.

SLOPE – The incline of a ground surface expressed as a ratio of horizontal distance to vertical distance.

SOIL – Any earth, sand, rock, gravel, or similar material.

STABILIZATION – The use, singly or in combination, of mechanical, structural, or vegetative methods, to prevent or retard erosion.

STORM DRAIN PERMIT or SD PERMIT — A permit given by the Department of Public Works to applicants which authorizes the discharge of runoff directly to the MS4 and indirectly to the waters of the Commonwealth.

STORM DRAIN (sometimes termed "storm sewer") — A sewer, ditch or channel that carries storm and surface waters, other than unpolluted cooling water. Except where the context would clearly designate one or the other, the term encompasses both underground piping and surface drainage easements containing ditches, swales, channels or detention or retention basins for the handling of water. A storm drain can be either publicly or privately owned. If publicly owned it is part of the Municipal Separate Storm Sewer System or MS4 (see definition above).

STORM DRAINAGE SYSTEM — A system by which stormwater is collected and/or conveyed. Such a system can be either publicly or privately owned. If publicly owned it is part of the Municipal Separate Storm Sewer System or MS4 (see definition above).

STORMWATER— Runoff from precipitation or snow melt.

STORMWATER AUTHORITY – The Town of Agawam Department of Public Works. The Stormwater Authority administers, implements, and enforces these Regulations and associated Chapter 176. Other Boards and/or departments may participate in the review process as defined.

STORMWATER DISCHARGE — The discharge of treated or untreated stormwater to the Town's MS4.

STORMWATER MANAGEMENT – The use of structural or non-structural practices that are designed to reduce stormwater runoff pollutant loads, discharge volumes, and/or peak runoof discharge rates.

STORMWATER MANAGEMENT PERMIT ─ A permit issued by the Department of Public Works, after review of an application, plans, calculations, and other supporting documents, which is designed to protect the environment of the Town from the adverse effects of uncontrolled and untreated stormwater runoff.

STORMWATER MANAGEMENT PLAN ─ A Plan to be submitted with the application for a Stormwater Management Permit, which shall include current and proposed site conditions, proposed improvements, proposed stormwater control measures, development schedules, and such other matters as may be required by the Department of Public Works.

STOP WORK ORDER ─ An order issued which requires that all construction activity on a site be stopped.

SUPERINTENDENT — The Superintendent of Public Works of the Town of Agawam or his authorized deputy, agent or representative.

TOXIC MATERIAL OR WASTE — See Hazardous Material or Waste above.

WASTEWATER — Any sanitary waste, sludge, or septic tank or cesspool overflow, and water that during manufacturing, cleaning or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct or waste product.

WATERCOURSE — A channel in which a flow of water occurs, either continuously or intermittently.

WATER RESOURCE — Same as “Waters of the Commonwealth.”

WATERS OF THE COMMONWEALTH — All waters within the jurisdiction of the Commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, coastal waters, and groundwater. These are protected water resources through state and/or federal regulation.

YARD DRAIN — Private catch basin located within lawn area and connected to the MS4 or discharges to a dry well or indirect discharge to waters of the Commonwealth.

SECTION 3: APPLICABILITY

Commented [P6]: Pulled from Chapter 176, Article III, Section 2

A. Administrative Review or Permit

No person may initiate a construction activity or land disturbance, including clearing, grubbing, land grading, earth moving, or other development or redevelopment activities that results in the disturbance of land in excess of the thresholds described below without Administrative Review for Stormwater Management or approval or waiver of the requirement for a Stormwater Management Permit by the Town's Department of Public Works.

1. Administrative Review for Stormwater Management is required for new development or redevelopment projects that will create, individually or part of a common plan of development or sale, between 5,000 and up to but not including 43,560 square feet of disturbance.

2. A Stormwater Management Permit is required for new development or redevelopment projects that will create 5,000 square feet or more of impervious surface or that will disturb one or more acres of land. This includes construction activities for new development or redevelopment that create less than 5,000 square feet of impervious surface or disturb less than one acre if that disturbance is part of a larger common plan of development or sale that all together creates 5,000 square feet or more of impervious surface or disturbs one or more acres of land.

Notwithstanding any exemption provided for below, any alteration, redevelopment, or conversion of land use to a "land use with a higher potential pollutant load" as defined above in Section 2 and in the most recent version of the Massachusetts Stormwater Handbook, and projects posing other potential water quality concerns shall require a Stormwater Management Permit.

B. Exemptions

The following use and activities are exempt from the requirements for Administrative Review for Stormwater Management or a Stormwater Management Permit. All exempt uses and activities must still comply with the purposes and the performance standards described in these Regulations. Failure of an exempt activity to comply with the purposes and performance standards described in these Regulations shall be interpreted as a violation and exempt status revoked. Note that changes at a site may not be split or phased in order to use this exemption repeatedly.

1. Any agricultural activity that is consistent with an approved soil conservation plan prepared or approved by the Natural Resources Conservation Service;

2. Any logging that is consistent with a Forest Cutting Plan approved under the Forest Cutting Practices Act by the Massachusetts Department of Conservation and Recreation;

3. Activities that are exclusively limited to maintenance and improvement of existing sidewalks, municipal roadways (including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving projects). Note that roadway widening or improvements that increase the amount of impervious surface area on the redevelopment site by greater than or equal to a single lane width are subject to the requirements of these Regulations.

4. Repairs to any stormwater treatment system deemed necessary by the Department of Public Works.

5. Any emergency activity that is immediately necessary for the protection of life, property or the environment, as determined by the Department of Public Works, Board of Health or Police and Fire.

SECTION 4: ADMINISTRATION

Commented [P7]: Pulled from Chapter 176, Article III, Section 3

A. Responsibility

As the Stormwater Authority, the Department of Public Works shall administer, implement and enforce these Regulations. Any powers granted to or duties imposed upon the Department of Public Works may be delegated in writing by the Superintendent of Public Works to employees or agents of the Department of Public Works.

The Department of Public Works may also designate Town Boards, including (but not limited to) the Planning Board, Zoning Board of Appeals, Conservation Commission, and the Board of Health, and/or their agents to review permit applications within the designated Board's expertise (the "Reviewing Board") and to make recommendations to the Department of Public Works. Such review shall follow the standards and criteria contained in these Regulations. Projects or activities approved by the Department of Public Works shall be deemed in compliance with the intent and provisions of these Regulations and Chapter 176 of the Town of Agawam Ordinances.

B. Fees

The Department of Public Works may establish a permit review fee schedule, based on the type and complexity of projects, and may update this fee as needed, and implement with approval of the City Council, to cover the costs of permit administration for Stormwater Management Permits.

Commented [P8]: Steve, assuming this is role for City Council. Correct?

If in the opinion of the Department of Public Works or its authorized agent, additional time or information is required for review of a waiver request, the Department of Public Works may continue a hearing to a date certain announced at the meeting. In the event the applicant objects to a continuance, or fails to provide requested information, the waiver request shall be denied.

SECTION 5: APPLICATION REQUIREMENTS AND PROCEDURES

No land owner or land operator shall receive any of the building, grading, or other land development permits required for land disturbance activities, and no land owner shall commence land disturbance activities, without approval of a Stormwater Management Permit from the Department of Public Works and without meeting the requirements of these Regulations.

While the applicant can be a representative, the permittee must be the owner of the site. Approval must be obtained from the Department of Public Works before the beginning of land-disturbing activities. Approval to proceed with site changes will be contingent on the application submission's completeness, demonstration of compliance with design standards and inspections.

A. Pre-application and Concept Plan Meeting

Prior to investing in extensive professional design efforts, it may be beneficial for applicants for Administrative Review for Stormwater Management and Stormwater Management Permit to attend at least one pre-application meeting with the Department of Public Works. This meeting is intended to provide the applicant with advice and guidance relative to the approval process; and allow the applicant and Department of Public Works to have a preliminary conversation about the site, stormwater management and erosion control considerations, and concept plan. The Department of Public Works may invite to this meeting other town boards and officers at its discretion.

For this pre-application meeting, the Town has a Low Impact Development design checklist to encourage a better site design approach. This checklist identifies several items that will be helpful for this preliminary meeting and may help to streamline the permitting process overall.

Commented [P9]: See draft LID checklist for applicant use for these meetings.

Deleted: This meeting can be combined with the pre-submission review meeting described under the Subdivision Regulations.¶

B. Administrative Review for Stormwater Management - Procedures and Standards

1. Administrative Review and Approval Required
   Approval for Administrative Stormwater Management Review must be obtained prior to

the commencement of any land disturbing activity for new development or redevelopment projects that will create, individually or part of a common plan of development or sale between 5,000 and up to but not including 43,560 square feet of disturbance.

2. Application
   A completed application for an Administrative Stormwater Management Approval shall be filed with the Department of Public Works. The Administrative Stormwater Management Approval Application package shall include:
   a. A completed Administrative Review Application Form with original signatures of all property owners;
   b. Narrative describing the proposed work, including existing and proposed site conditions (including structures, vegetation, and drainage), measures to mitigate any stormwater impacts, and anticipated maintenance requirements;
   c. A completed Checklist for Stormwater Report from the latest edition of the Massachusetts Stormwater Handbook to document compliance with applicable stormwater standards;
   d. An operation and maintenance plan to inspect, properly maintain and repair installed best management practices (BMPs) after project completion to ensure that they are functioning according to manufacturer or design specifications for the life of the BMP;
   e. Digital copy of plans that include:
      i. Existing site features including structures, pavement, plantings, and stormwater management systems etc.;
      ii. Proposed work including proposed stormwater management systems and limits of disturbance;
      iii. Basic erosion and sedimentation controls.

      The Department of Public Works may or may not require calculations using Hydrocad, depending on nature and scale of the project and possible impacts on surrounding areas.
   f. Payment of the application fee. Each application must be accompanied by the appropriate application fee as established by the Department of Public Works. Applicants shall also pay review fees as determined by the Department of Public Works sufficient to cover any expenses connected with the review of the Administrative Stormwater Management Approval Application before the review process commences. The Department of Public Works is authorized to retain a registered Professional Engineer (PE) or other professional consultant to advise the Department of Public Works on any or all aspects of the Application. Additional fee information is provided in Section 5.

3. Performance Standards

    a. To the extent that the project will discharge, directly or indirectly, to a water body subject to one or more pollutant-specific Total Maximum Daily Loads (TMDLs), implement structural and non-structural stormwater best management practices (BMPs) that are consistent with each such TMDL.
    b. To the extent the project will discharge, directly or indirectly, to an impaired water body not subject to a TMDL, implement structural and non-structural stormwater BMPs optimized to remove the pollutant or pollutants responsible for the impairment.
    c. Avoid disturbance of areas susceptible to erosion and sediment loss.
    d. Use Low Impact Development (LID) techniques where adequate soil, groundwater and topographic conditions allow. These may include but not be limited to reduction in impervious surfaces, disconnection of impervious surfaces from storm drains, bioretention (rain gardens), and infiltration systems.

4. Connections to the MS4

    The review and approval by the Department of Public Works of information submitted for connections to the MS4, does not relieve the applicant of full responsibility for the adequate protection of water resources as required by state and federal law, or to remediate any adverse impacts to downstream or adjacent properties adversely impacted by new runoff flow paths or flow regimes. If in the course of the construction and/or ongoing maintenance of the proposed BMPs it is determined by the Department of Public Works, the Town, or any other authority which has jurisdiction over the protection of water resources that the measures currently implemented are inadequate, the owner of the site shall be responsible for implementing improvements, adequate maintenance, and inspections of the protection measures such that the resource and adjacent properties are protected.

5. Consent to Entry onto Property

    An applicant consents to entry of the Department of Public Works or its authorized agents in or on site to verify the information in the application and to inspect for compliance with permit conditions.

6. Information requests

    The applicant shall submit all additional information requested by the Department of Public Works to issue a decision on the application.

7. Action by the Stormwater Authority

    The Department of Public Works' action rendered in writing, may consist of any of the following as a result of Administrative Review:

i. Approve the Administrative Review Application if it finds that the proposed plan meets the performance standards set forth herein;
ii. Approve the Administrative Review Application with conditions, modifications or restrictions that the Department of Public Works determines are required to meet the performance standards set forth herein; or
iii. Require submission of a Stormwater Management Permit Application if the project will disturb land beyond administrative review thresholds or in the opinion of the Department of Public Works requires more extensive review.

8. Project Changes
The Applicant must notify the Department of Public Works in writing of any change or alteration of a land-disturbing activity authorized in an Administrative Review Approval before any change or alteration occurs. If the Department of Public Works determines that the change or alteration is significant, based on the approved application and accepted construction practices, the Department of Public Works may require a Stormwater Management Permit application be filed. If any change or alteration from the Administrative Review Approval occurs during any land disturbing activities, the Department of Public Works may require the installation of interim erosion and sedimentation control measures before approving the change or alteration.

C. Stormwater Management Permit and Procedure

1. Stormwater Management Permit Approval Required
Approval of a Stormwater Management Permit must be obtained prior to the commencement of any land disturbing activity for new development or redevelopment projects that will create 5,000 square feet or more of impervious surface or that will disturb one or more acres of land. This includes construction activities for new development or redevelopment that create less than 5,000 square feet of impervious surface or disturb less than one acre if that disturbance is part of a larger common plan of development or sale that all together creates 5,000 square feet or more of impervious surface or disturbs one or more acres of land.

2. Application
A complete Stormwater Management Permit Application shall be filed with the Department of Public Works and shall include:
a. A completed Application Form with original signatures of all owners;
b. A list of abutters and addresses, certified by the Assessor's Office, within 300 feet of the property line of the site, including property owners in another municipality.
c. Proof of notification of abutters, which makes use of the form letter provided for in the Stormwater Management Permit application;

Commented [P10]: Had been 100 feet here. In Subdivision Regs, is 500 feet. Agreed that 300 more reasonable.

d. Digital copy of each of the following:
    i. Stormwater Management Plan, as specified in Section 7 of these Regulations;
    ii. Erosion and Sediment Control Plan, as specified in Section 7 of these Regulation;
    iii. Draft Operation and Maintenance Plan, including a drawing that shows locations of all stormwater management facilities, a maintenance schedule, and a draft Inspection and Maintenance agreement (final O&M Plan to be submitted as specified in Section 7 of these Regulations);
    iv. Hydrocad calculations with actual Hydrocad files

e. Payment of the initial application review and inspection fees.

3. Information Requests
   The applicant shall submit all additional information requested by the Department of Public Works to issue a decision on the application.

4. Determination of Completeness
   The Department of Public Works shall make a determination as to the completeness of the application and adequacy of the materials submitted. No review shall take place until the application is determined complete. If the Department of Public Works determines the application to be incomplete, the Department of Public Works will inform the applicant that the application will be denied based on the determination that the application is administratively incomplete unless the incomplete items are addressed by a specific date to be determined by the Department of Public Works. The Department of Public Works will require that an extension of the review period be granted to allow additional time for the applicant to provide the required information and the Department of Public Works to review the application once complete information has been submitted.

5. Entry
   Filing an application for a stormwater management permit with the Department of Public Works or its agent shall be deemed as the property owner's permission to enter the site to verify the information in the application and to inspect for compliance with permit conditions.

6. Inspections
   No plan will be approved without adequate provision for inspection of the property before development activity commences as required in Section 9.

7. Opportunity for Public Comment
   Applicants must notify abutters prior to submitting an application, using the form letter

Commented [P11]: Meets requirement in MS4 permit.

provided for in the Stormwater Management Permit application. The letter notifies abutters about the project and provides information for abutters to contact the Town Clerk for application documents and then comment directly to the Department of Public Works. This notification shall be made by certified mail with proof of mailing provided to the Department of Public Works at time of application submission.

The Department of Public Works is not required to hold a public hearing for projects or activities under the jurisdiction of these Regulations. For activities also requiring approval of other Town Boards, a public hearing shall be held in accordance with their procedures.

Where a public hearing is required through another permit process for the same project, the requirements to notify abutters as part of the Stormwater Management Permit application shall be waived.

8. Review and Actions

The Department of Public Works' action, rendered in writing, shall consist of either:

Approval of the Stormwater Management Permit Application based upon a determination that the proposed plan meets the criteria in Section 1 and Section 6 of these Regulations, and complies with the requirements of these Regulations;

Approval of the Stormwater Management Permit Application subject to any conditions, modifications or restrictions required by the Department of Public Works;

Disapproval of the Stormwater Management Permit Application based upon a determination that the proposed plan does not meet the criteria in in Section 1 and Section 6 of these Regulations or comply with the requirements of these Regulations or where the applicant fails to provide requested additional information that in the Department of Public Work's opinion is needed to adequately describe the proposed project.

The Department of Public Works shall take final action upon an application within 45 calendar days of the date of filing of the application, as determined by written notice to the Town Clerk of the filing of the application and of the date on which it was filed.

Failure of the Department of Public Works to take final action on an application within 45 days of the date of filing does not constitute nor imply approval of such application. If the Department of Public Works determines the initial application to be incomplete or if additional information is requested by the Department of Public Works or other Town Boards during the application review process, the 45-day period for taking final action on

an application may be extended to allow additional time for the applicant to provide the required information and the Department of Public Works and/or other Town Boards to review the additional application materials.

9. Connections to the MS4
   In the issuance of a stormwater management permit, the review and approval by the Department of Public Works of information submitted for connections to the MS4, does not relieve the applicant of full responsibility for the adequate protection of water resources as required by state and federal law, or to remediate any adverse impacts to downstream or adjacent properties adversely impacted by new runoff flow paths or flow regimes. If in the course of the construction and/or ongoing maintenance of the proposed BMPs it is determined by the Department of Public Works, the Town, or any other authority which has jurisdiction over the protection of water resources that the measures currently implemented are inadequate, the owner of the site shall be responsible for implementing improvements, adequate maintenance, and inspections of the protection measures such that the resource and adjacent properties are protected.

10. Project Start Date
    The project shall begin within two years after issuance of the Stormwater Management Permit. If the project does not begin within two years, and the Department of Public Works finds that the approved Stormwater Management Plan is inconsistent with current site conditions, the applicant shall submit a modified Plan that requires approval prior to commencement of land-disturbing activities. The Department of Public Works may grant an extension, at its discretion, to the two-year statute of limitations on a Stormwater Management Plan.

11. Project Changes
    No changes may be made to an approved Stormwater Management Plan without the prior approval of the Department of Public Works. The applicant must notify the Department of Public Works in writing of any proposed change. If the Department of Public Works deems the change to be significant, it may require that an amended Stormwater Management Permit application be filed with notification to abutters.

12. As-Built Drawings
    Applicants shall submit as-built drawings upon project completion. The as-built drawings must depict all on-site controls, both structural and non-structural, designed to manage stormwater associated with the completed site as specified in Section 11 of these Regulations.

D. Fees for Application Review and Inspections

The Department of Public Works may charge fees for application review and inspections.

1. Application fees
   Application fees shall be charged as follows, based upon the type of review and project area of disturbance. The fee shall be due at the time of application before review begins.

Administrative Review Fees

Area of disturbance	Fee
Between 5,000 square feet and up to but not including 43,560 square feet	$_____

Stormwater Management Permit Application Review Fees

Area of Disturbance	Fee
Less than 1 acre, but creation of 5,000 square feet or more of impervious surface	$_____
1 to 5 acres	$200
Above 5 to 20 acres	$700
Above 20 to 50 acres	$1,500
Above 50	$1,500 plus $25 per acre above 50

2. Department of Public Works Inspection Fees
   Inspection fees at the time of application will cover the costs of inspections conducted by the Department of Public Works. Inspections by the Department of Public Works shall be scheduled as follows:
   a. After placement of erosion control BMPs (this will be before beginning of land-disturbing activities or clearing);
   b. Before backfilling of any underground drainage utilities or structures
   c. Walk through to determine final punch list of items remaining
   d. Final inspection upon completion of all construction and stabilization of disturbed areas
   e. Random inspections may be conducted to ensure compliance with the permit

Commented [P12]: As recommended by Mike at last meeting, brought in language here from Chapter 175, 22, b, 2, b to reflect public works inspections that supplement those by applicant in Section 9. Right of Entry is covered in Section 10 below.

provisions

Fees shall be charged as follows, based upon the project area of disturbance. The fee shall be due before land-disturbing activities begin.

Inspection Fees

Commented [P13]: Note that these areas of disturbance do not cover projects under Administrative review.

Area of Disturbance	**Fee**
Less than 1 acre, but creation of 5,000 square feet or more of impervious surface	
1 to 5 acres	$100
Above 5 to 20 acres	$350
Above 20 to 50 acres	$750
Above 50 acres	$750 plus $10 per acre above 50

3. Determination of area of disturbance category
   If the area of the parcel(s) and area of project disturbance differ such that the area of disturbance will be in a lower fee category, the applicant may submit a certified statement by the project designer, a P.E., of the project's area of disturbance. If during construction the area of disturbance is expanded, the greater fee will be due before the certificate of completion will be issued. Emergency remediation, not included in the originally approved permit but required due to field conditions, outside of the project site will not be included in this area.

4. Consultant Fees

Commented [P14]: This section is new to you and from model.

   As provided by M.G.L. Ch. 44 §53G**,** the Department of Public Works may impose reasonable fees for the employment of outside consultants, engaged by the Department of Public Works, for specific expert services to assist the Department of Public Works in its review of applications for Administrative Review and Stormwater Management Permits and oversight of permit compliance.

   a. Special Account. Funds received pursuant to these rules shall be deposited with the municipal treasurer who shall establish a special account for this purpose. Expenditures from this special account may be made at the direction of the Department of Public Works without further appropriation as provided in G.L. Ch. 44 §53G. Expenditures from this account shall be made only in connection with a specific project or projects for which a consultant fee has been collected from the applicant. Expenditures of accrued interest may also be made for these purposes.

b. Consultant Services. Specific consultant services may include but are not limited to technical or legal review of the permit application and associated information, on-site monitoring during construction, or other services related to the project deemed necessary by the Department of Public Works. The consultant shall be chosen by, and report only to, the Department of Public Works or its staff.

c. Notice. The Department of Public Works shall give written notice to the applicant of the selection of an outside consultant. Such notice shall state the identity of the consultant, the amount of the fee to be charged to the applicant, and a request for payment of said fee in its entirety. Such notice shall be deemed to have been given on the date it is mailed or delivered. No such costs or expenses shall be incurred by the applicant if the application or request is withdrawn within five days of the date notice is given.

d. Payment of Fee. The fee must be received prior to the initiation of consulting services. The Department of Public Works may request additional consultant fees if necessary review requires a larger expenditure than originally anticipated or new information requires additional consultant services. Failure by the applicant to pay the specified consultant fee within ten (10) business days of the request for payment, or refusal of payment, shall be cause for the Department of Public Works to deny the application based on lack of sufficient information to evaluate whether the project meets applicable performance standards. An appeal stops the clock on the above deadline; the countdown resumes on the first business day after the appeal is either denied or upheld.

e. Appeals. The applicant may appeal the selection of the outside consultant to the Board of Selectmen, who may only disqualify the outside consultant selected on the grounds that the consultant has a conflict of interest or does not possess the minimum required qualifications. The minimum qualifications shall consist of either an educational degree or three or more years of practice in the field at issue or a related field. Such an appeal must be in writing and received by the Board of Selectmen and a copy received by the Department of Public Works, so as to be received within ten (10) days of the date consultant fees were requested by the Department of Public Works. The required time limits for action upon the application shall be extended by the duration of the administrative appeal.

Commented [P15]: Steve, Who in Agawam? Council?

f. Return of Unspent Fees. When the Department of Public Works' review of a permit application and oversight of the permitted project is complete, any balance in the special account attributable to that project shall be returned within 30 days. The

excess amount, including interest, shall be repaid to the applicant or the applicant's successor in interest. For the purpose of this regulation, any person or entity claiming to be an applicant's successor in interest shall provide the Department of Public Works with appropriate documentation. A final report of said account shall be made available to the applicant or applicant's successor in interest.

SECTION 6: PERFORMANCE STANDARDS

A. Resources and Guidance on Requirements

1. Massachusetts Stormwater Handbook and Stormwater Standards
   The *Massachusetts Stormwater Handbook and Stormwater Standards*, as updated or amended, is hereby incorporated by reference as part of these Regulations, and shall furnish additional policy, criteria and information, including specifications and standards for the proper implementation of the requirements of these Regulations.

   Volume 1 lays out the legal and regulatory framework for the *Massachusetts Stormwater Handbook*. The Massachusetts Stormwater Standards are contained in Chapter 1 of Volume 1.

   Volume 2 addresses the elements of stormwater management, particularly Best Management Practices (BMPs). This volume includes lists of acceptable stormwater treatment practices, including the specific design criteria for each stormwater practice. The manual may be updated and expanded from time to time, based on improvements in engineering, science, monitoring and local maintenance experience, at the discretion of the Massachusetts Department of Environmental Protection. Stormwater treatment practices that are designed and constructed in accordance with these design and sizing criteria will be presumed to meet the minimum water quality performance standards.

   Volume 3 describes how to document compliance through preparation of a Stormwater Report.

2. Rainfall Data
   The recommendation for rainfall data to be used in calculations is currently being updated as associated with the Massachusetts Stormwater Handbook. In the interim, applicants shall calculate stormwater peak runoff rates, using 90% of the upper confidence interval mean of NOAA Atlas 14 data for Agawam. MassDEP refers to this as "NOAA plus" and has indicated that it incorporates risk observed in the current data to reflect range of larger storms.

Deleted: in

Commented [P16]: Agreement to include for now so that do not continue to get projects designed with TP40 data. Because NOAA only reflects current rainfall data (so that projects meant to last 50+ years will essentially be under designed for future conditions), discussion about use of projected rainfall data (RMAT approach) remains important.

Recommended procedure:

- Navigate to NOAA 14 website: https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html
- Click Massachusetts map on the desired location
- Navigate to "point of interest," and tabular results will pop up
- Multiply 0.9 by the NOAA upper confidence interval mean to obtain peak runoff rate for a given design storm

3. Erosion and Sediment Control
   For guidance on erosion and sediment control practices, see: *Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas*, MassDEP, 2003, and as updated or amended.

4. Pollutant Removal
   Pollutant removal capabilities for stormwater management facilities, unless otherwise stated, shall be calculated consistent with EPA Region 1's BMP Performance Extrapolation Tool or other BMP performance evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance, any federally or state approved BMP design guidance or performance standards (e.g. State stormwater handbooks and design guidance manuals) may be used to calculate BMP performance.

B. General Performance Standards

When the proposed discharge may have an impact upon a sensitive receptor, including aquifers, streams, wetlands, and/or storm sewers, the Superintendent of the Department of Public Works may require an increase in minimum standards and requirements.

1. Massachusetts Stormwater Management Standards
   All projects subject to these Regulations shall comply with all Massachusetts Stormwater Management Standards (or be more stringent than those standards).

2. Nitrogen Optimization
   Stormwater BMPs must be optimized for nitrogen removal. Guidance is provided in Attachment 1 to Appendix H of the 2016 MS4 Massachusetts permit. When proposed BMPs are not covered in EPA Region 1's tools, any other state of federally approved BMP performance estimates can be used to estimate pollutant removal of the proposed or installed BMP.

3. Low Impact Development

All projects must use Low Impact Development (LID) site planning and design strategies unless not feasible in order to reduce runoff from both new and redevelopment projects.

If full compliance is not provided, an applicant must document why key steps in the process could not be met and what is proposed for mitigation. Strategies should include:

a. Identify, map, and preserve the site's natural features and environmentally sensitive areas such as wetlands, aquifers, native vegetation, stands of trees and trees with a trunk diameter at breast height of 8 inches or more, slopes, drainage ways, soils, including especially permeable soils and prime farmland soils, flood plains, and woodlands to the greatest extent possible;
b. Identify, map, and protect riparian buffers by establishing a naturally vegetated buffer system along all perennial streams and other water features that encompass critical environmental features such as the 100-year floodplain, steep slopes (in excess of 15%), lake shorelands, and wetlands. Also, prohibit any mowing and brush hogging within riparian buffers.
c. Identify any coldwater fish resources in the project drainage area and mitigate potential thermal impacts from the project, including preserving riparian buffers, specifically preservation and/or restoration of riparian trees and shrubs to provide shade, use of BMPs that make use of infiltration, creation of new natural areas with native vegetation and clustering of trees, establishing no-mow zones, and providing shade for impervious surfaces wherever possible.
d. Prevent adverse impacts of proposed activities on habitats mapped by the Massachusetts Natural Heritage and Endangered Species Program as endangered, threatened or of special concern, estimated habitats of rare wildlife and certified vernal pools, and priority habitats of rare species;
e. Minimize grading and clearing;
f. Delineate potential building envelopes, avoiding environmental resource areas and appropriate buffers by clustering buildings and reducing building footprints;
g. Develop methods to minimize impervious surfaces and protect and preserve open space. Reduce impervious surfaces wherever possible through alternative street design, such as omission of curbs and use of narrower streets, shared driveways and through the use of shared parking areas where allowed;
h. Ensure that new fill or soils brought to site do not change the infiltration characteristics of the site;
i. Ensure that all work is planned and executed so as to avoid compaction of topsoil and subsoils, including such best practices as reducing the number of trips required over area of disturbance, laying down soil protective mats for trafficked areas, and avoiding work after rain or snowmelt that soaks soils. For construction equipment, best practices should include using vehicles with low axle loads, reduced tire

pressures, and use of flotation tires, doubles, radial tires, and/or large-diameter tires. For areas where such practices are not possible and soils are to be compacted by heavy equipment, subsurface restoration must occur prior to final landscaping activities.

Commented [P17]: Addition is recommendation for Impervious Area Mitigation Strategy, p 3-1.

j. Promote erosion and sediment control by using measures that are appropriate to the conditions of the site. Prevention of erosion is preferred over sedimentation control.

During planning:

i. Avoid sensitive areas, steep slopes, and highly erodible soils to the maximum extent possible when developing site plans.
ii. Maximize groundwater recharge.
iii. Sequence activities to minimize simultaneous areas of disturbance.
iv. Identify potential problem areas before the site plan is finalized and approved.
v. Divert uncontaminated water around disturbed areas.
vi. Plan to use sediment barriers along contour lines, with a focus on areas where short-circuiting (i.e., flow around the barrier) may occur.
vii. Use berms at the top of a steep slopes to divert runoff away from the slope's edge.
viii. Design trapezoidal or parabolic vegetated drainage channels, not triangular.
ix. Use vegetated channels with rip rap check dams, instead of impervious pavement or concrete, to reduce the water velocity of the conveyance system.
x. Design a check dam or sediment forebay with level spreader at the exit of outfalls to reduce water velocity of the discharge and collect sediment.
xi. Use turf reinforcement matting to stabilize vegetated channels, encourage vegetation establishment, and withstand flow velocities without scouring the base of the channel.
xii. Plan open channels to follow land contours so natural drainage is not disrupted.
xiii. Use organic matting for temporary slope stabilization and synthetic matting for permanent stabilization.
xiv. Provide a stable channel, flume, or slope drain where it is necessary to carry water down slopes.
xv. Protect and manage on- and off-site materials storage areas (overburden and stockpiles of dirt, borrow areas, or other areas used solely by the permitted project are considered a part of the project)

During construction:

i. Minimize the amount of disturbed area and protect natural resources.

ii. Institute interim and permanent stabilizations measures no more than 7 days after construction activity has temporarily or permanently ceased on that portion of the site.
iii. Protect slopes on the construction site.
iv. Protect all storm drain inlets and armor all newly constructed outlets.
v. Use perimeter controls that provide protection along the site's edge before sediment reaches roadway, storm drains, or adjacent properties.
vi. Stabilize construction site entrances and exits to prevent off-site tracking.
vii. Inspect stormwater controls at regular intervals and especially following any storm.
viii. Clean and sweep up any debris accidentally tracked, dumped or spilled off site.

k. Manage runoff using smaller, decentralized, low-tech stormwater management techniques to treat and recharge stormwater close to the source.
l. Lengthen flow paths and maximize sheet flow.
m. Use nonstructural, low-tech methods including open drainage systems, disconnection of roof runoff, and street sweeping where possible.
n. Use native plant vegetation in buffer strips and in rain gardens (small planted depressions that can trap and filter runoff).
o. Use drought-resistant vegetation.
p. Integrate the following techniques into the site design to create a hydrologically functional lot or development site, including but not limited to the following based on soil, groundwater level, and topographic conditions:

i. Reduction of impervious surface
ii. On-site infiltration, flow attenuation, and pollutant removal of runoff on-site to existing areas with grass, trees, and similar vegetation and through the use of open vegetated swales and natural depressions, and amended soils that will store, filter, and infiltrate runoff;
iii. Bioretention (rain gardens);
iv. Open vegetated swales and natural depressions;
v. Use of permeable pavement;
vi. Use of roof gardens where practicable;
vii. Re-use of stormwater to replace water used for irrigation, toilet flushing, or industrial processes.

4. Management of Construction Materials and Wastes

Construction materials and all wastes on site will be managed so as to avoid polluted flows. This includes: demolition materials, excess or discarded building or site material, including but not limited to concrete truck washout, chemicals, litter and sanitary waste.

5. Hazardous Chemicals and Petroleum Products

Projects involving the storage or use of hazardous chemicals or petroleum products shall incorporate handling and storage best management practices that prevent such chemicals from contaminating runoff from the site into infiltration systems, receiving water bodies, or the MS4, and shall include a list of such chemicals in the application.

6. Connection to MS4

If the destination for the outlet of a stormwater management facility is the MS4, the applicant must evaluate the existing capacity and condition of that system. If there are existing deficiencies or extra capacity is not available to accept additional flows from the project site, the applicant will be required to design and construct improvements or reduce the outlet flow rate based on existing capacity.

7. Emergency Overflow

All stormwater management facilities shall be designed to provide an emergency overflow system and incorporate measures to provide a nonerosive velocity to flow along its length and at any outfall.

8. Down-stream Structures

The designed release rate of any stormwater structure shall be modified if any increase in flooding or stream channel erosion would result at a down-stream dam, highway, structure, or normal point of restricted stream flow.

9. Centralized Detention Facilities

Detention basins for stormwater management should be used only as a last resort and only if there are serious site constraints that prevent the use of other BMP stormwater management facilities.

Certain industrial areas already have centralized detention facilities. The following describes the allowed percent of impervious area before on-site detention is required.

Site Location	Site Impervious Area Credit for Centralized Detention
Agawam Regional Industrial Park: Bowles Road, Almgren Drive, Abrahms Drive	25%
Suffield St. Industrial Park Gold Street	50%
Moylan Lane	25%

C. Performance Standards for New Development

Stormwater management systems for new development projects shall be designed to meet an average annual pollutant removal equivalent to 90% of the average annual load of Total Suspended Solids (TSS) related to the total post-construction impervious area on the site AND 60% of the average annual load of Total Phosphorus (TP) related to the total post-construction impervious surface area on the site.

Average annual pollutant removal requirements are achieved through one of the following methods:

1. Installing BMPs that meet the pollutant removal percentages based on calculations developed consistent with EPA Region 1's BMP Accounting and Tracking Tool (2016) or other BMP performance evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance, then any federally or State-approved BMP design guidance or performance standards (e.g., State stormwater handbooks and design guidance manuals) may be used to calculate BMP performance; or

2. Retaining the volume of runoff equivalent to, or greater than, one (1.0) inch multiplied by the total post-construction impervious surface area on the new development site; or

3. Meeting a combination of retention and treatment that achieves the above standards.

D. Performance Standards for Redevelopment

Stormwater management systems on redevelopment sites shall be designed to meet an average annual pollutant removal equivalent to 80% of the average annual post-construction load of Total Suspended Solids (TSS) related to the total post-construction impervious area on the site AND 50% of the average annual load of Total Phosphorus(TP) related to the total post-construction impervious surface area on the site.

Average annual pollutant removal requirements are achieved through one of the following methods:

1. Installing BMPs that meet the pollutant removal percentages based on calculations developed consistent with EPA Region 1's BMP Accounting and Tracking Tool (2016) or other BMP performance evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance, then

any federally or State-approved BMP design guidance or performance standards (e.g., State stormwater handbooks and design guidance manuals) may be used to calculate BMP performance; or

2. Retaining the volume of runoff equivalent to, or greater than, 0.8 inch multiplied by the total post-construction impervious surface area on the redeveloped site; or

3. Meeting a combination of retention and treatment that achieves the above standards; or

4. Utilizing offsite mitigation that meets the above standards within the same USGS HUC12 as the redevelopment site.

E. Performance Standards for Redevelopment Projects Offsite Mitigation

1. For Redevelopment projects where the Applicant proposes to utilize off-site mitigation to meet the average annual pollutant removal requirements of Part D just above, the Applicant will describe in writing why it is not technically feasible to meet the average annual pollutant removal requirements on-site, including which on-site treatment BMPs were considered and why they were deemed not feasible.
2. Off-site mitigation shall be located within the Town of Agawam and the same tributary to the maximum extent feasible. Under no circumstances will off-site mitigation be located outside the same USGS HUC12.
3. The off-site mitigation project shall be designed and constructed in a manner consistent with the requirements of these Regulations.
4. The Department of Public Works shall, at its discretion, identify priority areas in which offsite mitigation may be completed.
5. Offsite mitigation provided at a site not owned by the Town requires a separate Stormwater Management Permit covering the off-site mitigation project (even with disturbance less than 1 acre), the terms and conditions of which, including ongoing operations and maintenance requirements, shall run with the land where the off-site mitigation is located.
6. Construction of the off-site mitigation project shall commence within 12 months of Stormwater Management Permit issuance and be completed within 12 months of commencement.

F. Stormwater Management Design Standards

Commented [P18]: These are from state-wide model regulations.

1. Projects must manage surface runoff so that no proposed flows are conducted over public ways, nor over land not owned or controlled by the Applicant unless a drainage easement in proper form is obtained permitting such discharge.

2. Projects must use TR-55 and TR-20 methodologies to calculate peak rate and volume of runoff from pre-development to post-development conditions with 90% of the upper confidence interval mean of NOAA Atlas 14 data for Agawam.
3. Watershed area for hydrologic analysis and BMP sizing calculations must include at a minimum the site area and all upgradient areas from which stormwater runoff flows onto the site.
4. For purposes of computing runoff, all pervious lands in the site are assumed prior to Development to be in "good hydrologic condition" regardless of the conditions existing at the time of the computation.
5. Length of sheet flow used for times of concentration is to be no more than 50 feet.
6. Soils tests to be conducted by a Registered Professional Engineer or Massachusetts Soil Evaluator, performed at the location of all proposed LID techniques and BMPs, to identify soil descriptions, depth to estimated seasonal high groundwater, depth to bedrock, and soil texture.
7. The design infiltration rate shall be determined from the on-site soil texture and Rawls rates as published in the Massachusetts Stormwater Handbook or saturated hydraulic conductivity tests.
8. Size drainage pipes to accommodate the 25-year storm event and maintain velocities between 3 and 10 feet per second, and provide calculations using the Mannings Equation.
9. Size drainage swales to accommodate the 25-year storm event and velocities below 4 feet per second.
10. Size culverts to accommodate the 50-year storm event and design adequate erosion protection. Design stream crossing culverts in accordance with the latest edition of the Massachusetts Stream Crossing Handbook.
11. Size stormwater basins to accommodate the 100-year storm event with a minimum of one foot of freeboard.
12. All subsurface drainage structures are to be able to accommodate HS-20 loading.
13. Catch basins structures are to be constructed as required by the Department of Public Works and spaced a maximum of 250 feet apart in roadways.
14. Catch basins adjacent to curbing are to be built with a granite curb inlet as required by the Department of Public Works.
15. Catch basins in low points of road and on roads with profile grades greater than 5 percent are to be fitted with double grates (parallel with curb) as required by the Department of Public Works.
16. All drainpipes are to be reinforced concrete pipe or High-Density Polyethylene (HDPE) pipe and have a minimum diameter of 12 inches.
17. Outfalls are to be designed to prevent erosion of soils, and pipes 24 inches or larger are to be fitted with grates or bars to prevent ingress.
18. Drainage easements are to provide sufficient access for maintenance and repairs of system components and be at least 20 feet wide.

Commented [P19]: Mike will check standard detail to make sure agreement between that and this.

19. Minimize permanently dewatering soils by:
    a. Limiting grading within 4 feet of seasonal high groundwater elevation (SHGWE);
    b. Raising roadways to keep roadway section above SHGWE; and
    c. Setting bottom floor elevation of building(s) a minimum of 2 feet above SHGWE.

SECTION 7: PLAN REQUIREMENTS

For projects meeting the Administrative Review thresholds for applications, see Section 5 above for submission details.

For the stormwater management plan and erosion and sediment control plan in parts A and B below, a narrative summary on how the applicant has addressed the standards in Section 6 is part of the plan requirements.

A. **Stormwater Management Plan**

A Stormwater Management Plan submitted with the permit application shall contain sufficient information for the Department of Public Works to evaluate the environmental impact, effectiveness and acceptability of the site planning process and the measures proposed by the applicant to reduce adverse impacts from stormwater runoff during construction and post-construction in the long term.

The Superintendent of the Department of Public Works may require and alter as they see fit the components of the Stormwater Management Plan. All components of the Stormwater Management Plan shall be prepared and submitted with the stamp and signature of a Professional Engineer licensed in the Commonwealth of Massachusetts. That engineer shall be available during the construction phase to advise the builder of any alterations required to protect resource waters and adjacent properties as needed from water volume and water quality impacts due to the project.

The minimum information submitted for support of a stormwater management plan shall be as follows:

1. Names, addresses and phone numbers of the applicant, owner and preparer;

2. A locus map, using a portion of the relevant USGS Quadrangle Map to show the site and properties within a minimum of 500 feet from the project property line;

3. Existing conditions map showing:
    a. Lot lines and lines of existing streets;
    b. The existing zoning and land use at the site;

c. The existing site hydrology and topography at 2-foot intervals;
d. A description and delineation of existing stormwater conveyances, impoundments, and wetlands on or adjacent to the site or into which storm water flows;
e. A delineation of 100 and 500-year flood plains, if applicable;
f. Estimated seasonal high groundwater elevation (November to April) in areas to be used for storm water retention, detention, or infiltration;
g. Habitats mapped by the Massachusetts Natural Heritage & Endangered Species Program as Endangered, Threatened, or of Special Concern, Estimated Habitats of Rare Wildlife and Certified Vernal Pools, and Priority Habitats of Rare Species within five hundred (500) feet of any construction activity;

4. Existing conditions and proposed land use map showing:
   a. The location(s) of existing and proposed easements;
   b. The location of existing and proposed buildings and/or structures, including materials and approximate height;
   c. The location of existing and proposed utilities, roadways; driveways, and parking areas;
   d. The proposed limits of disturbance;
   e. Estimate of the total area expected to be disturbed by excavation, grading, or other construction activities;

5. Stormwater management design plan(s) and details showing:
   a. The site's existing and proposed topography with contours at 2-foot intervals;
   b. The existing and proposed vegetation and ground surfaces with runoff coefficient for each;
   c. Soils information from test pits performed at the location of proposed stormwater management facilities, including soil descriptions, depth to season high groundwater, depth to bedrock, and infiltration rates. Soils information will be based on site test pits logged by a Massachusetts Registered Soil Evaluator, a Massachusetts Registered Sanitarian, or a Massachusetts Registered Professional Engineer;
   d. A drainage area map showing pre- and post-construction watershed boundaries, drainage area and storm water flow paths;
   e. A description and drawings of all components of the proposed drainage system, including:
      - locations, cross sections, and profiles of all brooks, streams, drainage swales and their method of stabilization;
      - drainage patterns and approximate slopes anticipated after major grading activities;
      - all measures for the detention, retention or infiltration of water;

- all measures for the protection of water quality;
- the structural details for all components of the proposed drainage systems and storm water management facilities;
- notes on drawings specifying materials to be used, construction specifications, and typicals;
- expected hydrology with supporting calculations;
- proposed improvements including location of buildings, utilities, or other structures, impervious surfaces, and drainage facilities, if applicable;
- any other information requested by the Department of Public Works

6. A landscaping plan, showing and describing existing and proposed vegetation and the woody and herbaceous vegetative stabilization and management techniques to be used within and adjacent to the stormwater practices.

7. Hydrologic and hydraulic design calculations for the *pre-development and post-development conditions*. Calculations shall include:
   a. Hydrologic soils group (HSG) information, soil type, and relevant characteristics for the purpose of modeling the project's runoff, using NRCS soils information
   b. Description of design storm frequency, intensity, and duration;
   c. Time of concentration;
   d. Runoff Curve Number (RCN) based on land use and soil hydrologic group;
   e. Peak runoff rates and total runoff volumes for each watershed area for the 2-year, 10-year and 100-year 24-hour storms;
   f. Information on construction measures used to maintain the infiltration capacity of the soil where any kind of infiltration is proposed;
   g. Infiltration rates where applicable;
   h. Groundwater recharge analysis and BMP drawdown (time to empty)
   i. Culvert capacities;
   j. Flow velocities;
   k. Data on the increase in rate and volume of runoff for the specified design storms;
   l. Data showing how project stormwater BMPs are optimized for nitrogen removal, using estimated Nitrogen load from the proposed project and the load reduction achieved through proposed BMPs (calculations should use material provided for in Attachment 1 of Appendix H of the Massachusetts MS4 Permit or as otherwise updated by EPA Region 1)
   m. Data and documentation of sources for all computation methods and field test results showing how the project will meet stormwater runoff water quality and/or retention requirements of New Development or Redevelopment specified in Section 6. This shall include:

- Water quality design calculations showing the estimated Total Suspended Sediment (TSS) load from the proposed project and the load reduction achieved through proposed BMPs

  and

- Water quality design calculations showing the estimated Phosphorus load from the proposed project and the load reduction achieved through proposed BMPs (Attachments 2 and 3 in Appendix F of the Massachusetts MS4 Permit or as otherwise updated by EPA Region 1)

  or

- Calculations showing runoff volume from the total post-construction impervious surface area and retention of required volume

  or

- Calculations showing how will meet required standards through a combination of water quality treatment and retention

n. Data showing BMP performance for land uses of higher potential pollutant loads if applicable.
o. Documentation of sources for all computation methods and field test results.
p. Post-development downstream analysis, if deemed necessary by the Department of Public Works. The downstream analysis will evaluate the hydrologic impacts of the project downstream of the project to a location where the watershed to project size is approximately equal to 10:1;

B. Erosion and Sediment Control Plan

The Erosion and Sediment Control Plan, which must meet the performance standards in Section 6 shall include:

1. Name and contact information for party responsible for maintaining erosion and sediment control measures;
2. Description of site conditions and location and details of selected erosion and sediment control measures appropriate to the site;
3. A narrative of the construction sequence/phasing of the project, with timing, schedules, and sequence of development, including clearing, stripping, rough grading, construction, final grading, and vegetative stabilization;
4. Description of both operation and maintenance for structural and non-structural measures, interim grading, and material stockpiling areas;
5. Path and mechanism to divert uncontaminated water around disturbed areas, to the maximum extent practicable;
6. Location and description of and implementation schedule for temporary and permanent seeding, vegetative controls, and other stabilization measures;
7. A maintenance schedule for the period of construction;

8. A description of how demolition materials, litter, sanitary waste, and any other waste will be managed on site and a description of construction materials expected to be stored on-site. The Plan shall include a description of controls to reduce pollutants from these materials, including storage practices to minimize exposure of the materials to stormwater, and spill prevention and response.

The Erosion and Sediment Control Plan must be stamped and certified by a qualified Professional Engineer registered in Massachusetts or a Certified Professional in Erosion and Sediment Control.

C. Operation, Maintenance, and Inspection Agreement, Schedule, and Plan

The owner shall be responsible for adequate maintenance of BMPs described in the stormwater management plan for short-term and long-term control measures.

A draft Operation and Maintenance Plan (O&M Plan) is required at the time of stormwater plan submission for all projects. The O&M Plan shall be designed to ensure compliance with the Stormwater Management Permit and the Massachusetts Surface Water Quality Standards, 314, CMR 4.00 are met in all seasons and throughout the life of the system. All contents identified below shall be included in the draft document.

A final O&M Plan shall be submitted upon project completion. The O&M Plan shall remain on file with the Department of Public Works and shall be an ongoing requirement. The O&M plan and all of its contents shall be recorded at the Registry of Deeds. Proof of that recording shall be included with the submission of the final O&M Plan. Contents of the O&M Plan shall include:

1. The name(s) of the owner(s) for all components of the system;

2. A plan drawn to scale showing the location of all stormwater BMPs in each treatment train, including catch basins, manholes/access lids, main, and stormwater devices, along with the discharge point;

3. A description and delineation of public safety features;

4. An estimated operations and maintenance budget, including inspections;

5. Maintenance agreements that specify:
    a. The names and addresses of the person(s) responsible for operation and maintenance;

b. The person(s) responsible for financing maintenance and emergency repairs;
c. An Inspection and Maintenance Schedule for all stormwater management facilities including routine and non-routine maintenance tasks to be performed;
d. Agreement that the person(s) responsible for operation and maintenance will follow this schedule and maintain an operation and maintenance log to include inspections, repairs, replacement and disposal (type of material and disposal location);
e. Agreement on submission of annual reports each year by January 31st for all operation and maintenance activities in the previous calendar year to the Department of Public Works Superintendent, or as approved by the Superintendent.
f. A map and list of easements with the purpose and location of each;
g. Information on how future property owners will be notified of the presence of the stormwater management system and the requirement for proper operation and maintenance;
h. The signature(s) of the owner(s) and person(s) responsible for operation and maintenance.

6. Stormwater Management Easement(s)
    a. Stormwater management easements shall be indicated by the property owner(s) as necessary for:
        i. Access for facility inspections and maintenance;
        ii. Preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities, including flood routes for the 100-year storm event;
        iii. Direct maintenance access by heavy equipment to structures requiring regular maintenance.
    b. The purpose of each easement shall be specified in the maintenance agreement signed by the property owner.
    c. Stipulation that the owner of land on which is located a stormwater management easement shall not cause or permit the same to become clogged or any water flow into or through the same to be impeded by debris, siltation, vegetation (in excess of what is needed to control erosion), the placement of any structure or otherwise; nor shall the owner cause or permit any condition to exist, such as loss of suitable ground cover, which would contribute to the erosion or siltation of the drainage channel. Any continuing violation of this section after reasonable notice from the Superintendent shall entitle the Town to enter onto the easement to repair or correct the offending condition and bill the costs thereof to the owner.
    d. Stormwater management easements are required for all areas used for off-site stormwater control, unless a waiver is granted by the Department of Public Works.

e. Easements and other applicable deed restrictions shall be recorded with the Hampshire County Registry of Deeds prior to issuance of a Certificate of Completion by the Department of Public Works.

7. Changes to Operation and Maintenance Plans
   a. The owner(s) of the stormwater management system must notify the Department of Public Works of changes in ownership or assignment of financial responsibility.
   b. The maintenance schedule in the Maintenance Agreement may be amended to achieve the purposes of this Regulation by mutual agreement of the Department of Public Works and the Responsible Parties. Amendments must be in writing and signed by all Responsible Parties. Responsible Parties shall include owner(s), persons with financial responsibility, persons with operational responsibility, and easement grantors.

D. Plan Certification Statements

The owner or authorized representative and all contractors and subcontractors shall sign certification statements as part of the permit application and the stormwater management and erosion and sediment control plans. In signing the plans, the authorized representative certifies that the information is true and assumes liability for the plans. Official signatures provide a basis for an enforcement action to be taken against the person signing the documents.

1. The owner certification statement shall read:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

2. Contractors and subcontractors certification statement shall read:

   "I certify under penalty of law that I understand the terms and conditions of the Stormwater Management Permit."

   The storm drain permit application shall list all contractors and subcontractors who will implement the measures identified in the stormwater management plan.

SECTION 8: SURETY

Surety will be secured in the following ways depending on project type:

A. Subdivisions

The stormwater management permit requirements shall be included in the Planning Board's bond amount for subdivision construction, in that the subdivision plans shall reflect the requirements of the Department of Public Works stormwater management permit. The bond amount for the drainage system shall reflect all structures proposed on the project site, in the public way, and within easements to be given to the Town for drainage purposes.

B. Site plans

The Department of Public Works will request that the building occupancy permit be withheld until the Department of Public Works has issued a Certificate of Completion for the proposed drainage system.

The Department of Public Works will not issue a Certificate of Completion for release of the bond amount related to stormwater until it has in hand the required final submissions as indicated in Section 12.

SECTION 9: INSPECTIONS AND SITE SUPERVISION

A. Site Supervision and Inspections

1. Pre-construction Meeting
   Prior to starting any clearing, excavation, and construction, the applicant, the applicant's technical representative, the general contractor or any other person with authority to make changes to the project, may be required to meet with the Department of Public Works or its designated representative to review the approved plans and their proposed implementation. The need for a pre-construction meeting shall be determined by the Department of Public Works based on the project scope.

2. On-site Plan for Reference
   A paper copy of the approved project Site Plans bearing the signature of approval of the Agawam Department of Public Works shall be maintained at the site during the progress of the work.

3. Inspections
   The applicant shall be responsible for all inspections and covering the costs of each. The inspections described here are to be done in coordination with the Department of Public

Works, which will be conducting its own inspections as provided for in Section 5.

At a minimum, inspections of the stormwater management system shall be performed at the following intervals during construction:

a. Erosion and sedimentation control measures shall be inspected before the start of construction. The Department of Public Works shall be notified at least 24 hours prior inspection. Additional erosion and sedimentation control inspections shall occur either:
    - At least once every seven (7) calendar days; or
    - Once every fourteen (14) calendar days and within 24 hours of the occurrence of a storm event of 0.25 inches or greater or the occurrence of runoff from snowmelt sufficient to cause a discharge.

    The Department of Public Works and/or its agents reserves the right to conduct random inspections to ensure effective control of erosion and sedimentation during all phases of construction at the applicant's expense.

b. Any underground drainage or stormwater conveyance or infiltration structures shall be inspected prior to backfilling/pre-bury.

c. Walk through inspection to determine final punch list of items remaining.

d. When all work, including construction of stormwater management facilities and landscaping, has been completed, a final inspection of the project site shall be performed and shall include a full, dated video inspection of all stormwater pipes installed.

Erosion and sedimentation control inspections shall be conducted by a professional knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possess the appropriate skills and training to assess conditions at the construction site and respond with quickly with recommendations for remedy as needed.

All other inspections shall be conducted by the Project Design Engineer to verify proper installation and functioning of all installed stormwater features. The Project Design Engineer shall notify the Department of Public Works at least 24 hours prior to each inspection.

If the Project Design Engineer finds the system to be properly installed and functioning,

he/she shall provide certification to the Department of Public Works, which is responsible for issuing a Certificate of Completion. Certification to the Department of Public Works shall consist of an engineering stamp on the final as-built plans as described in Section 11. The Project Design Engineer must be a Registered Professional Engineer in the State of Massachusetts.

If the system is found to be inadequate due to operational failure, even though built according to the Stormwater Management Plan, the system shall be corrected by the applicant. If the applicant fails to act, the Department of Public Works may use the performance guarantee to complete the work.

If the system does not comply with the Plan, the applicant shall be notified in writing of the violation and the required corrective actions. A Stop Work order shall be issued until any violations are corrected and all work previously completed has received approval by the Department of Public Works.

Periodic inspections in addition to those described above may be conducted by a designated representative of the Project Design Engineer, as approved by the Department of Public Works, who will be a Professional Engineer licensed by the Commonwealth of Massachusetts.

Written reports shall be submitted to the applicant and the Department of Public Works after each inspection and shall include:

- The inspection date and location
- Name of inspector and credentials
- Type of inspection
- Date of last inspection
- Weather at time of inspection
- Accumulated precipitation within previous 24 hours
- Evaluation indicating that either work is in compliance with the stormwater management permit and approved or that there are violations and failure to comply with requirements of the approved plan
- Steps to be taken to correct violations, if present

The applicant shall promptly correct any portion of the work that does not comply. If in the course of inspections, it is determined that water resources or the MS4 is not being adequately protected, enforcement action will proceed at the discretion of the Department of Public Works in accordance with the procedures described in Section 13.

SECTION 10: RIGHT OF ENTRY

When any new drainage control facility is installed on private property, or when any new connection is made between private property and a public drainage control system or sanitary sewer, the filing of an application shall be deemed as the property owner's permission to the Department of Public Works and/or its agent for the right to enter the property at reasonable times and in a reasonable manner for the purpose of inspection. This includes the right to enter a property when the Department of Public Works has a reasonable basis to believe that a violation of these Regulations is occurring or has occurred and to enter when necessary for abatement of a public nuisance or correction of a violation of these Regulations.

SECTION 11: AS-BUILT DRAWINGS

The permittee shall submit as-built drawings of all on-site stormwater controls and treatment practices, both structural and nonstructural, designed to manage the stormwater associated with the completed site. As-built drawings shall be full size plans that include all final grades and clearly depict all changes to project design from the approved plans, if any, and be certified by the Project Engineer who must be a Massachusetts Registered Professional Engineer. These plans shall be submitted upon project completion, unless an extension is granted by the Department of Public Works. Submission shall include one paper copy and digital format in pdf format.

SECTION 12: FINAL SUBMISSIONS AND CERTIFICATE OF COMPLETION

Upon project completion, the applicant shall submit As-Built Drawings in accordance with Section 11, a final Operations and Maintenance Plan with proof of recording at the Registry of Deeds and in accordance with Section 7, and certify that the project is in accordance with approved plans and specifications.

The Department of Public Works will issue a Certificate of Completion only upon its receipt of these documents and plans.

While a Certificate of Occupancy may be issued prior to receiving a Certificate of Completion by the Department of Public Works, a bond may be held after issuance of a Certificate of Occupancy until all site work is completed and a Certificate of Completion is issued by the Department of Public Works.

SECTION 13: ENFORCEMENT

Commented [P20]: Note that Section 13 and 14 here pulled from Chapter 176, Article I, Sections 4 and 5 and modified only to reflect that reference Regulations here.

A. Authorized Enforcement Agency

The Department of Public Works will serve as the authorized enforcement agency. The Department of Public Works or an authorized agent of the Department of Public Works shall enforce this Ordinance and any associated regulations, orders, violations notices, and enforcement orders, and may pursue all civil and criminal remedies for such violations.

B. Enforcement and Penalties

1. Criminal and Civil Relief
   a. Any person who violates any provision of this Ordinance, associated regulations, permit, notice, or order thereunder, shall be punished by a fine not to exceed $300 per violation. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

   b. The Department of Public Works may seek injunctive relief in the court of competent jurisdiction restraining the person from activities which would create further violations or compelling the person to perform abatement or remediation of the violation.

2. Orders
   a. The Department of Public Works or an authorized agent of the Department of Public Works may issue a written order to enforce the provisions of this chapter or the regulations thereunder, which may include:
      Elimination of illicit connections or discharges to the MS4;
      Performance of monitoring, analyses, and reporting;
      Cessation of unlawful discharges, practices, activity, or operations;

      Maintenance, installation, or performance of additional erosion and sediment control measures;

      Implementation of measures to minimize the discharge of pollutants until such time as the illicit connection or discharge of pollutants shall be eliminated; and
      Remediation of contamination in connection therewith.

   If the enforcing person determines that abatement or remediation of contamination is required, the order shall set forth a deadline by which such abatement or remediation must be completed. Said order shall further provide that, should the violator or property owner fail to abate or perform remediation within the specified deadline, the Department of Public Works may, at its option, undertake such work, directly or through a contractor, and expenses thereof shall be charged to the violator.

   Within 30 days after completing all measures necessary to abate the violation or to perform remediation, the violator and the property owner will be notified of the costs

incurred by the city, including administrative costs.

The violator or property owner may file a written protest objecting to the amount or basis of costs with the Department of Public Works within 30 days of receipt of the notification of the costs incurred. If the amount due is not received by the expiration of the time in which to file a protest or within 30 days following a decision of the Department of Public Works affirming or reducing the costs, or from a final decision of a court of competent jurisdiction, the costs shall become a special assessment against the property owner and shall constitute a lien on the owner's property for the amount of said costs. Interest shall begin to accrue on any unpaid costs at the statutory rate provided in M.G.L. c. 59, § 57 after the 31st day at which the costs first become due.

b. Written orders shall contain the following:

- The name and address of the owner applicant;
- The address when available or the description of the building, structure, or land upon which the violation is occurring;
- A statement specifying the nature of the violation;
- A description of the remedial measures necessary to bring the development activity into compliance with this Ordinance and a time schedule for the completion of such remedial action;
- A statement of the penalty or penalties that shall or may be assessed against the person to whom the notice of violation is directed;
- a statement that the determination of violation may be appealed to the municipality by filing a written notice of appeal within thirty (30) days of service of notice of violation pursuant to the procedures of M.G.L.c.40a, §15.

3. Emergency Enforcement Action

The Superintendent of Public Works may determine that an eminent threat to public health, safety, or the environment exists. Skipping the normal order of enforcement action may be required, including immediate suspension of access to the MS4. The Department of Public Works or designated agent may take immediate action to suspend access to the MS4 or perform actions to bring the site into compliance. The Department of Public Works has the right to bill the violator for penalty fees, reasonable costs of materials, and manpower to perform these emergency actions, and administrative costs. Within 30 days after completing all measures necessary to abate the violation or to perform remediation, the violator and the property owner shall be notified of the costs incurred by the Town, including administrative costs. The violator or property owner may file a written protest objecting to the amount or basis of costs with the Department of Public Works within 30 days of receipt of the notification of the costs incurred.

Any bills sent to violators which remain unpaid for a time period of 30 days, or the time in which to protest, or within 30 days following a decision by the Department of Public Works affirming or reducing the costs, or from a final decision of a court of competent jurisdiction, the costs shall become a lien against the property until paid.

4. Restoration of Land

Any violator may be required to restore land to its undisturbed condition. In the event that restoration is not undertaken within a reasonable time after notice, the Department of Public Works, or its designated agent, may take necessary corrective action, the cost of which shall become a lien upon the property until paid.

5. Hold on Certificate of Occupancy and/or Storm Drain Permit

For development or redevelopment projects, a certificate of occupancy will not be granted until corrections to all stormwater practices have been made and accepted by the Department of Public Works.

No new Department of Public Works storm drain permits will be issued to owners or contractors that have enforcement orders currently in effect against any project. The hold will be released once all remediation work is complete and approved by Department of Public Works.

6. Stop-work Orders

The Department of Public Works may issue stop-work orders on any project which is found in violation of the storm drain permit or this chapter until adequate corrective action is complete to the satisfaction of the Department of Public Works.

Persons receiving a notice of violations will be required to halt all construction activities. This "stop work order" will be in effect until the Department of Public Works confirms that the development activity is in compliance and the violation has been satisfactorily addressed. Failure to address a notice of violation in a timely manner can result in civil, criminal, or monetary penalties in accordance with the enforcement measures authorized in this Ordinance. The Department of Public Works may utilize the services of a Massachusetts registered engineer to verify compliance at the Applicant's expense.

7. Noncriminal Disposition

As an alternative to criminal prosecution or civil action, the Town of Agawam may elect to utilize the noncriminal disposition procedure set forth in MGL c. 40, § 21D, in which case the Town of Agawam Superintendent of Public Works, or his/ her designee shall be the enforcing person. The penalty for the first violation shall be a warning. The penalty for the second violation shall be $100. The penalty for the third and subsequent

Commented [P21]: Tiering here based on state model bylaw.

violations shall be $300. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

8. Entry to Perform Duties Under this Chapter

To the extent permitted by state law, or if authorized by the owner or other party in control of the property, the Town of Agawam, the Superintendent of Public Works or his/her designee, its agents, officers, and employees may enter upon privately owned property for the purpose of performing their duties under this chapter and regulations and may make or cause to be made such examinations, surveys or sampling as deemed reasonably necessary.

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9. Appeals

The decisions or orders of the Superintendent of Public Works shall be final. Further relief shall be to a court of competent jurisdiction.

10. Remedies Not Exclusive

The remedies listed in this chapter are not exclusive of any other remedies available under any applicable federal, state or local law.

SECTION 14: SEVERABILITY

The provisions of these Regulations are hereby declared to be severable. If any provision, paragraph, sentence, or clause of these Regulations or the application thereof to any person, establishment, or circumstances shall be held invalid, such invalidity shall not affect any other provisions or applications of these Regulations, and shall continue in full force and effect.

Pre-application concept meeting *Prepared by PVPC*

For projects seeking stormwater management and erosion & sediment control permit

Low Impact Development Checklist

To promote a Low Impact Development (LID) approach, the Town of Agawam Department of Public Works encourages all those applying for a stormwater management and erosion and sediment control permit to join the Planning Board for a pre-application concept meeting.

This meeting is intended to be beneficial for applicants prior to investing in extensive professional design efforts. The meeting will serve to provide applicants with advice and guidance relative to the permit approval process, but also allow the applicant and Public Works
to have a preliminary conversation about the site, stormwater management and erosion and sediment control considerations, and concept plan. It may also help to streamline the permitting process overall.

Public Works may invite to this meeting other town boards and officers at its discretion.

What is Low Impact Development?

"Low impact development" (LID) is a development approach that seeks to maintain (or in the case of redevelopment, restore/recreate) a site's predevelopment hydrology through protection of on-site natural features and environmentally sensitive site design through the following:

- Limiting impervious areas
- Preserving existing flow patterns
- Preserving native vegetation and soils, other natural resources and open space
- Using decentralized small-scale facilities to capture and manage rainfall (or snowmelt) close to where it falls (these small-scale facilities serve to slow, absorb, and treat flow and include bioretention areas, grass swales, porous pavements, cisterns, and green roofs and walls)

The checklist below identifies several items that will be helpful to bring to this meeting. All of these items are meant to be simple, low-cost drawings and analyses prepared by a professional landscape architect, architect, planner, site designer, or engineer.

1. <u>Existing resources site analysis map</u> that identifies, locates, and describes noteworthy features to be designed around:

___ Rivers, streams, and wetlands, and existing drainage patterns

___ Flood plains

___ Areas of flat, moderate, and steep slopes, and natural existing drainage patterns

___ Native vegetation, significant and/or rare vegetation, mature trees, woodlands

___ Farmland soils

___ Cultural or historic resources, including stone walls

___ Threatened or endangered species, and vernal pools

___ Unusual geological formations, including exposed ledge

___ Scenic views or viewsheds

2. Hydrologic soils group (HSG) map and soils description of site and abutting properties using NRCS mapping tool. Following are instructions to get Hydrologic Soils Group Map and Descriptions at https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

   - Establish Area of Interest (AOI), inputting site address in Quick Navigation drop-down menu and then use rectangle or polygon tool to draw AOI. Double click or CTRL+click to close the AOI polygon
   - Click on Soil Data Explorer tab
   - Click on Soil Properties and Qualities tab
   - Select Soil Qualities and Features from menu
   - Select Hydrologic Soil Groups from drop-down menu
   - Make sure map, table, description boxes are checked
   - Click on View Rating, which will produce map with the HSGs color coded, a table, and description of soils that you can print

3. Sketch plan, based on the existing resources/site analysis map, that illustrates conceptual layout of the proposed development or redevelopment, including:

___ Note of existing zoning and proposed use

___ Proposed building, driveway, and street footprints

___ Proposed site access (points of ingress and egress)

___ Location of utilities

___ Anticipated limits of disturbance and areas to be protected from disturbance

___ Calculation on estimated total square feet of new impervious area. If redevelopment project, show numbers of existing and new proposed.

___ Drainage areas, showing location of existing and proposed stormwater management facilities with identification of type of facility

Some questions for consideration at pre-application concept meeting:

Is development being designed to avoid ecologically important areas and critical watercourses, wetlands, and steep slopes?

Are natural existing drainage patterns proposed to be preserved and/or impacts minimized?

Are proposed built elements and site improvements located where development can occur with the least environmental impact?

Have built elements been clustered to maximize open space/pervious areas?

Have disturbance areas been delineated to avoid unnecessary clearing or grading?

Are impervious surfaces kept to the minimum extent practicable?

Are impervious surfaces disconnected from draining to the municipal storm system and directed to appropriate pervious areas or LID stormwater management facilities?

What are the proposed LID stormwater management facilities, and do they make sense given soils indicated from the desk top analysis?

How is stormwater management design also addressing groundwater drinking water supply protection? (For example, if a land use involves deliveries of fuel or other such potential contaminant, how is the stormwater management facility providing for containment of any potential spills?)

Town of Agawam – Site Inspection Form

Erosion & Sediment Control

Adapted by PVPC from
2013 SOP#6 developed by Fuss & O'Neill for Central MA Stormwater Coalition

Guidelines

1. The inspection shall begin at a low point and work uphill, observing all discharge points, erosion and sediment control features, and any off-site support activities.
2. Written and photographic records shall be obtained and included in this report for each site visit.
3. The inspector shall always wear personal protective equipment appropriate for the site.
4. The inspector shall abide by the contractor's site-specific safety requirements.
5. The inspector has legal authority to enter the site. However, if denied permission to enter the site, the inspector shall not force entry.

General information

Project name:			
Project location:			
Site operator:			
Inspector's name:			
Inspector's title and qualifications:			
Date of inspection:		Date of last inspection:	
Start time:		End time:	

Type of Erosion and Sediment Control inspection:
Stormwater regulations require inspections to occur before start of construction and either at least once every 7 calendar days or once every 14 calendar days *and* within 24 hours of a storm event of 0.25 inches or greater

Before start of construction ☐	7 calendar day inspection ☐	14 calendar day inspection ☐	Within 24 hours of a storm event ≥ 0.25 inches ☐

Describe the weather conditions at time of inspection:	
Describe the current phase of construction:	

Document any of the following issues found on the construction site, and the corrective action(s) required for each.

Issue	Status	Correction Action Needed
1. Have all Erosion and Sediment Control (ESC) features been constructed before initiating other construction activities?	Yes □ No □	
2. Is the contractor inspecting and maintaining ESC devices regularly?	Yes □ No □	
3. Is existing vegetation maintained on the site as long as possible?	Yes □ No □	
4. Is construction staged so as to minimize exposed soil and disturbed areas?	Yes □ No □	
5. Are disturbed areas restored as soon as possible after work is completed?	Yes □ No □	
6. Is clean water being diverted away from the construction site?	Yes □ No □	
7. Are sediment traps and sediment barriers cleaned regularly?	Yes □ No □	
8. Are vegetated and wooded buffers protected and left undisturbed?	Yes □ No □	
9. Are soils stabilized by mulching and/or seeding when they are exposed for a long time?	Yes □ No □	
10. Has vegetation been allowed to establish itself before flows are introduced by channels?	Yes □ No □	
11. Is regular, light watering used for dust control?	Yes □ No □	
12. Is excessive soil compaction with heavy machinery avoided to the extent possible?	Yes □ No □	

Issue	Status	Correction Action Needed
13. Are erosion control blankets used when seeding slopes?	Yes □ No □	
14. Are trees and vegetation that are to be retained during construction adequately protected?	Yes □ No □	
15. Are areas designated off-limits to construction equipment flagged or easily distinguishable?	Yes □ No □	
16. If topsoil has been excavated and stockpiled for later use on the project, are stockpiles adequately protected?	Yes □ No □	
17. Are temporary slope drains or chutes used to transport water down steep slopes?	Yes □ No □	
18. Do all entrances to the storm sewer system have adequate protection?	Yes □ No □	

Attach photos as needed for documentation.

The inspector shall provide the applicant/site operator and the _____ Planning Board (the stormwater authority) with a copy of this report and notice of the corrective action(s) to be taken.

The applicant/site operator shall promptly correct any portion of the work that does not comply, or the applicant will be subject to the bonding provisions or the penalty provisions within the Stormwater Management and Erosion and Sediment Control Ordinance and Regulations.

LOW IMPACT DEVELOPMENT REVIEW CHECKLIST - Subdivision R&R NDPES MS4 Community: Town of Agawam		Created and executed by Pioneer Valley Planning Commission, SFY 2021	
This checklist was developed using The Center for Watershed Protection's Code and Ordinance Worksheet; U.S. Environmental Protection Agency's Water Quality Scorecard (2009); the Metropolitan Area Planning Council's Low Impact Development Toolkit Checklist for Regulatory Review; and EPA's April 2011 Checklist entitled, "Assessing Street and Parking Design Standards to Reduce Excessive Impervious Cover..."			
Y/N	**Checklist Item**	**Notes (include location in code and any standards)**	**Example Language**
	Assess Street Design and Parking Lot Guidelines (NPDES Draft permit 2.3.6)		
	Within four (4) years of the effective date of this permit, the permittee shall develop a report assessing current street design and parking lot guidelines and other local requirements that affect the creation of impervious cover. This assessment shall be used to provide information to allow the permittee to determine if changes to design standards for streets and parking lots can be made to support low impact design options. If the assessment indicates that changes can be made, the assessment shall include recommendations and proposed schedules to incorporate policies and standards into relevant documents and procedures to minimize impervious cover attributable to parking areas and street designs. The permittee shall implement all recommendations, in accordance with the schedules, contained in the assessment. The local planning board and local transportation board should be involved in this assessment. This assessment shall be part of the SWMP. The permittee shall report in each annual report on the status of this assessment including any planned or completed changes to local regulations and guidelines.		
	Street Standards in Subdivision Regulations		
	Roadway Width and Length		
?	1.1 Is paved roadway width standard set for LID purposes in low density residential developments with less than 500 daily trips? (LID standard: 18-22 feet)	Use table from *Sustainable Neighborhood Road Design Guidebook for MA* ; MA 527 CMR Fire Code, Section 18.2.3.4.1.1 Fire department access roads shall have an unobstructed width of not less than 20 feet (6.1 m). Fire department access roads constructed in the boulevard-style shall be allowed where each lane is less than 20 feet but not less than ten feet when they do not provide access to a building or structure.	
N	1.2 At higher densities are parking lanes allowed to also serve as traffic lanes (i.e., queuing streets)?	No mention of parking lanes	
N	1.3 Are narrower pavement widths allowed on road sections were there are no houses, buildings, intersections, or on-street parking spaces?		
N	1.4 Are reductions in frontage distances allowable where appropriate (i.e. open space developments, around cul-de-sacs, and along outside sideline of curved streets) to increase number of homes per unit length and to minimize street length?	See suggestion in 159-8.	
N	1.5 Can permeable paving be used for residential roads, shoulders, and parking lanes?	See suggestions in 159-19 (Street and Roadway) and 159-23 (Sidewalks)	
N	Do alignments specify: Streets ought to be located in order to protect important natural features, avoiding low areas and steep slopes in particular?	See suggestion in 159-8 Design Standards: Streets	(A) Streets shall be located and designed to maintain and preserve natural topography (avoiding low areas and steep slopes in particular), significant landmarks, and trees; to minimize cut and fill; and to preserve and enhance views and vistas on or off the subject parcel. (B) Developers are encouraged to lay out streets along east-west or north-south axes in order to allow building siting to take advantages of passive solar heat gain and accommodate future solar electric installations on south-facing roofs.
	Right of Ways		
?	2.1 Is the minimum right of way width less than 45 feet for a residential street? (For 500 ADT, between 33 and 36 feet?)	Unspecified? See table from Sustainable Neighborhood Road Design Guidebook for MA	
N	2.2 Does the code allow utilities to be placed under the paved section of the ROW?	See page 36 for suggestion	All utilities (electric, telephone, cable TV, fiber optic, and all other conduits) should be located under the roadway so as to optimize use of the right of way area for swales and other stormwater management facilities, sidewalks, and street trees.
Y	*Does the code allow utilities to be placed immediately adjacent to the paved section of the ROW?*	Unspecified in code, but shown as such in Table 4.1 Typical Roadway Section	

Y/N	Checklist Item	Notes	
N	*2.3 Do the regulations limit clearing within the right-of-way to the minimum necessary?*	See suggestion in 159-19 Street and Roadways. For a LID and tree-friendly approach, it is important to specify preference for preservation of natural resources wherever efficient and practicable. This section would dictate the limits of disturbance for clearing and construction of right-of-ways.	Developers are encouraged to limit clearing within the right-of-way to the minimum necessary to construct the roadway, drainage, sidewalk, and utilities, and to maintain site lines. Under this approach, it is not required to clear and grub the entire right-of-way. Upon completion, developers shall ensure that soils intended to percolate groundwater are permeable and have not been compacted by construction vehicles.
Y	*Do regulations require clearing and grubbing of entire right of way?*	See suggestion in 159-19 Street and Roadways	
N	*2.4 Are street trees required for new streets?*	Not specified. 159-26: Shade Trees does specify 2 tree per lot with sizing reqs within 20' of roadway, but this is outside of tree belt. In addition to requiring the planting of street trees, it is a good idea to specify that the tree belt can be designed for green stormwater management	Tree belts may include bioretention areas or other vegetated stormwater systems. Bioretention areas should utilize noninvasive species that are not on any Massachusetts invasive plant list, and that can tolerate cycles of drought and inundation. Bioretention areas should utilize Massachusetts Stormwater Management Standards.
N	*If yes, is this shown in the street cross section that may be provided?*		
	Cul de Sacs		
N	3.1 Are landscaped/bioretention islands required in the center of cul de sacs?	No reqs for landscaping or land cover; see pg 159:27	All dead-end streets with turnaround islands are encouraged to be planted with trees and/or other vegetation or left with natural tree growth in lieu of paving the entire area of the island. The maintenance of the inner circle shall be the responsibility of developers, their successors and assigns, or a homeowners' association. Where soils are conducive to infiltration (Natural Resource Conservation Service hydrologic soils group A or B), the center island may serve as a stormwater bioretention area with notched or perforated curbing to allow for entry of storm flow. Invisible curbing, where granite curbing forms an at-grade edge with the asphalt, is permitted in this situation.
Y	*Is curbing required for cul de sacs?*	Seemingly so by extension of 159-19 Streets and Roads (Construction Standards); no mention is made in 159-8.E. Dead Ends (Design Standards). See suggestion in each	
N	3.2 Is minimum required radius for a cul de sac set for LID purposes (LID standard: 35 feet)?	Set to 100' minimum (pg 159:27). *Sustainable Neighborhood Road Design* recommends 50 foot outside radius. Massachusetts Fire Code 527 CMR requires 20 foot drive lanes and minimum inside turning radius of 25 feet. (Section 18.2.3.4.3.1)	
N	3.3 Are alternative turnarounds such as hammerhead allowed on short streets in low density residential developments?	No mention of alternative turnarounds. See suggestion on pg 159:27. Hammerheads use less pavement overall than cul-de-sacs. Example in Column D is per *Sustainable Neighborhood Road Design* .	A hammerhead turnaround having a thirty (30) foot minimum curb radii; forty-five (45) foot minimum center lane radii, a head adequate for three point turn maximum, and a (length to accommodate local firefighting vehicle).
N	3.4 Are dead ends discouraged by the regulations? (e.g. by encouraging or requiring connected streets or one-way loop streets)?	See suggestion on page 159:27. Connected road network is of great importance to functioning and efficient road network, reducing response time for public safety officials.	(1) Dead-end streets are discouraged. Developers should make every effort to avoid the creation of dead-end streets and should connect proposed subdivisions to existing dead end streets wherever reasonable and practicable. A developer may demonstrate that a dead end street is appropriate when they can demonstrate that a future connection to an existing street is not possible or practicable, or when the surrounding property will never need a street connection because of extremely sensitive or permanently protected natural resources. In this situation the project must provide a viable pedestrian and bicycle connection to the surrounding property as appropriate.
	Sidewalks		
Y	4.1 Are sidewalks always required on both sides of residential streets?	See suggestion in 159-23 Construction Standards: Sidewalks	
N	*In low density neighborhoods, are sidewalks permitted on only one side of the road?*	See table from Sustainable Neighborhood Road Design Guidebook for MA	

N	4.2 Is permeable paving allowed for sidewalks?	See suggestion in 159-23 Construction Standards: Sidewalks. Permeable pavements provide increased traction when wet because water does not pool, and the need for salt, sand, and plowing is reduced during winter due to low/no black ice development. Compared to traditional paving methods, long-term maintenance costs may be lower in cold climates since permeable pavements resist cracking and buckling in freeze-thaw conditions. Nevertheless, permeable paving requires regular maintenance including: annual inspection of paver blocks for deterioration; periodic replacement of sand, gravel and vegetation; and annual industrial vacuuming of pavements to unclog sand and debris (Note: The use of sand in ice prevention should be avoided because it will clog pavement pores.) http://www.bostoncompletestreets.org/pdf/2/chap2_5	If the site permits infiltration, sidewalks may be constructed of permeable paving materials. If using permeable materials, the developer must work in consultation with the Department of Public Works and an engineer with experience in this field, and materials must be evaluated at regular intervals as they age. Pervious asphalt should be based on specifications such as those found in the University of New Hampshire Stormwater Center Design Specifications for Porous Asphalt Pavements and Infiltration Beds. Sidewalks or pedestrian areas may also be construct stormwater runoff to a swale or other BMP.
N	4.3 Are alternative pedestrian network layouts allowed (rather than placement in ROW)?		
N	*4.4 Is sidewalk width standard set for LID purposes? (LID standard 4 feet or less)*	Unclear, developer is instructed to refer to "Design Standards for the various classes of streets" which is not provided	
Y	*4.5 Where curb and gutter streets are required, are sidewalks required to be disconnected from the stormwater system (e.g. by a green strip)?*	Two green strips/tree belts, one on each side, are req'd between sidewalk and road (see 159-26)	
	Bus waiting areas		
-	Standard for this area should be permeable paving.	No mention of bus stops/transit	
	Curbs		
Y/N	**Checklist Item**	**Notes**	
N	*Do street standards permit LID stormwater management approaches (i.e. allow swales or other such BMP instead of curb and gutter) or are curbs and gutters REQUIRED improvements?*	159-21 Drainage seems to require gutter/catch basins, but recommendation is remove this section and refer out to the SWM Bylaw.	If pursuing LID design standards, curbs should either be eliminated or, when deemed necessary to protect the roadway edge, they should be perforated or invisible. Interrupted curbs are curbs with gaps that allow stormwater to move from the street through to a stormwater management facility, such as planters, swales, rain gardens, or tree filter boxes.
N	*Where curbs are necessary/required, are perforated curbs that allow runoff into swales or other stormwater BMPs allowed?*	See suggestions in Design Standards 159-8 Streets and Construction Standards 159-19 Street and Roadway	
N	*Does the town have criteria for design of roadside swales?*		
N	*Where curbing is needed, think about specifying granite curbing as a way to help keep roads narrow overall. (With asphalt curbing it is hard to plow to the curb since material can be easily damaged. The tendency is to account for this extra width needed in winter months.*	Granite only specified at intersections, and bituminous elsewhere as per 159-19 Street and Roadway.	
N	*Where curb and gutter systems are installed, are inlets / drains required to have a notice regarding discharge to receiving waters?*	See suggestion in 159-21 Drainage	
	Other		
N	Are there provisions indicating that roadways ought to be located so as to protect important natural features, avoiding low areas and steep slopes?	See suggestion in 159-8 Streets	Streets shall be located and designed to maintain and preserve natural topography (avoiding low areas and steep slopes in particular), significant landmarks, and trees; to minimize cut and fill; and to preserve and enhance views and vistas on or off the subject parcel. All significant natural features such as: large trees, watercourse and wetlands, as well as scenic and historic areas shall be preserved where possible and practicable. These features add to both the attractiveness, and economic value of the subdivision and the City.
N	Are developers required to rehabilitate soils that have been compacted by construction vehicles?	See suggestion in 159-8 Streets	
	Local Regulations and Feasibility of Green Infrastructure (NPDES Draft permit 2.3.6)		
	Within four (4) years from the effective date of the permit, the permittee shall develop a report assessing existing local regulations to determine the feasibility of making, at a minimum, the following practices allowable when appropriate site conditions exist: i. Green roofs; ii. Infiltration practices such as rain gardens, curb extensions, planter gardens, porous and pervious pavements, and other designs to manage stormwater using landscaping and structured or augmented soils; and iii. Water harvesting devices such as rain barrels and cisterns, and the use of stormwater for non-potable uses. The assessment should indicate if the practices are allowed in the MS4 jurisdiction and under what circumstances are they allowed. If the practices are not allowed, the permittee shall determine what hinders the use of these practices, what changes in local regulations may be made to make them allowable, and provide a schedule for implementation of recommendations. The permittee shall implement all recommendations, in accordance with the schedules, contained in the assessment. The permittee shall report in each annual report on its findings and progress towards making the practices allowable.		

	Are the following practices allowable when appropriate site conditions exist:	See Non-MS4 model or MS4 LID model to add to Drainage/Stormwater Mgmt sections, or to ensure are included in community's stormwater mgmt code and subdivision code references out to them	
	i. Green roofs;		
	ii. Infiltration practices such as rain gardens, curb extensions, planter gardens, porous and pervious pavements, and other designs to manage stormwater using landscaping and structured or augmented soils; and		
	iii. Water harvesting devices such as rain barrels and cisterns, and the use of stormwater for nonpotable uses.		
	If no, please describe impediments:		
	Development Policies in Subdivision Regulations		
N	Does the preliminary plan processes encourage an LID approach from the outset?	See Article III for suggestions. Encourage developers to incorporate Better Site Design (BSD)/Low Impact Development (LID) techniques in their projects at the outset by requiring a BSD or LID plan for preliminary subdivisions applications. The Town could help by providing a developer with a standard site analysis checklist that will help during the early stages of the project to maximize design and functionality of BSD/LID practices. Applicants can bring the results of this analysis to a pre-application conference. As part of this analysis and reporting, the applicant could identify proposed BMPs. Soil testing for this site analysis would be for the site overall and not as rigorous as the more detailed soil work for an individual facility/BMP design in the definitive plan stage. This process for site analysis could also be emphasized for all projects requiring site plan approval and for projects requiring a stormwater management plan	Under Preliminary Plan/General: To the fullest extent reasonable and practicable, all subdivisions shall be designed and constructed to incorporate the most recent LID design standards, best practices, policies and design elements. To include in Preliminary Plan Contents: Location and limits of soil types, particularly Agricultural Soils, consistent with the soils classification maps prepared by the Natural Resources Conservation Service. Areas where the depth of natural soil to bedrock is four (4) feet or less. The extent of any Interim Wellhead Protection Areas and Recharge Areas. Delineation of slopes of twenty-five percent (25%) or greater. Areas delineated as “BioMap Core Habitat” or “Supporting Natural Landscape” on the Massachusetts BioMap Project developed by the Massachusetts Natural Heritage & Endangered Species Program.
N	Definitive plans	See Article III for suggestions. Critically important to define a process that combines submissions for SW Management Permit with Definitive Plan to avoid	Stormwater Management and Erosion and Sediment Control Permit An Application for a Stormwater Management and Erosion and Sediment Control Permit, in accordance with Section ___ of the _____ [General/Zoning
N	Are regulations that govern stormwater within the subdivision code consistent with the Stormwater Management/LID ordinance/bylaw? (see controlling standards, drainage, and other relevant sections)	Suggestion to remove specific swm language from Subdivision R&R and refer out to update SWM Ordinance. Drainage section within subdivision regulations should refer applicants to SW Management Permit bylaw/ordinance and regulations. Best not to describe requirements in subdivision regulations so that avoid conflict with updates, etc.	
N	Do the site development standards explicitly permit LID stormwater management approaches?		
N	Do regulations address context sensitive development measures? (indicate all that apply)		All significant natural features such as: large trees, watercourse and wetlands, as well as scenic and historic areas shall be preserved where possible and practicable. These features add to both the attractiveness, and economic value of the subdivision and the town.
	Reducing Cut and Fill	See suggestions in Article III	
	Requiring limits to disturbance on construction site		
	Minimizing disturbanc to hillsides and/or ridgelines		
	Requiring or encouraging preservation of natural vegetation or topography?		
Y	Do landscaping regulations promote the planting of street trees in private and public development projects?	Shade trees generally, and req tree belts. See suggestions for street trees in new 159-24.	
N	Are there any regulations controlling tree clearance or removal of mature trees / forest stands?	See suggestion in new 159-24.	

Chapter 159

PVPC Recommendations to Promote LID and Green Infrastructure in Subdivision Projects and Align better with updated Stormwater Management Bylaw and Regulation and September 2017 (E&R Grant FY18)

PVPC Recommendations for same, March 2021 (MVP Action Grant FY21)

SUBDIVISION OF LAND

GENERAL REFERENCES

Building construction — See Ch. 82.

Fees — See Ch. 103.

Streets and sidewalks — See Ch. 155.

Water and sewers — See Ch. 175.

Zoning — See Ch. 180.

ARTICLE I
Authority and Interpretation

§ 159-1. Adoption of rules.

Under the authority vested in the Planning Board of the Town of Agawam by MGL c. 41, § 81-Q, the Board hereby adopts these rules and regulations governing the subdivision of land in the Town of Agawam. Such rules and regulations shall be effective on and after the first day of June 1954. This authority shall be interpreted according to the directive of MGL c. 30, § 61 and 62.

§ 159-2. Amendment of statute. (Approved 7-18-1972)

A. Section 2 of Chapter 30 of the Massachusetts General Laws is hereby amended by inserting after § 60 the following two sections:

"Section 61. All agencies, departments, boards, commissions and authorities of the commonwealth shall review, evaluate and determine the impact on the natural environment of all works, projects or activities conducted by them and shall use all practicable means and measures to minimize damage to the environment. Unless a clear contrary intent is manifested, all statutes shall be interpreted and administered so as to minimize and prevent damage to the environment. Any determination made by an agency of the commonwealth shall include a finding describing the environmental impact, if any, of the project and a finding that all feasible measures have been taken to avoid or minimize said impact.

"As used in this section and Section 62, damage to the environment' shall mean any destruction, damage or impairment, actual or probable, to any of the natural resources of the commonwealth and shall include but not be limited to air pollution; water pollution; improper sewage disposal; pesticide pollution; excessive noise; improper operation of dumping grounds; impairment and eutrophication of rivers, streams, floodplains, lakes, ponds or other surface or subsurface water resources; and destruction of seashores, dunes, marine resources, wetlands, open spaces, natural areas, parks or historic districts or sites. Damage to the environment shall not be construed to include any insignificant damage to or impairment of such resources.

"Section 62. No agency, department, board, commission or authority of the commonwealth or any authority of any political subdivision thereof shall commence any work, project or activity which may cause damage to the environment until 60 days after it has published a final environmental impact report in accordance with the provision of this section or until 60 days after a public hearing on said report, provided that research, planning, design and other preliminary work necessary to describe and evaluate such project for the purposes of this section may be undertaken.

"An environmental impact report shall contain detailed statements describing the nature and extent of the proposed work and its environmental impact; all measures being utilized to minimize environmental damage; any adverse short-term and long-term environmental consequences which cannot be avoided should this work be performed; and alternatives to the proposed action and their environmental consequences. The preparation of said report shall be commenced during the initial planning and design phase of any work, project or activity subject to this section, and the report shall be so prepared and disseminated as to inform the originating agency, reviewing agencies, the appropriate regional planning commission, the Attorney General and the public of the environmental consequences of state actions and the alternatives thereto prior to any commitment of state funds and prior to the commencement of the work, project or activity. All reviewing agencies and any state agency, department, board, commission, division or authority which has jurisdiction by law or special expertise with respect to any environmental impact involved shall affix their written comments to the final impact report. In order to ensure an interdisciplinary review, the Secretary of Environmental Affairs shall, in conjunction with any agency involved, jointly approve the selection of any consultant engaged to prepare the draft or final impact report.

"The secretaries of the executive officer shall each promulgate rules and regulations approved by the Secretary of Environmental Affairs to carry out the purposes of this section which shall be applicable to all agencies, departments, boards, commissions, authorities or instrumentalities within each of such executive offices and which shall conform to the requirements of the National Environmental Policy Act, Public Law 81-190, and amendments thereto. Any draft report, final report and all written comments required by said regulations shall be public documents. Said reports shall be submitted to the Secretary of Environmental Affairs, who shall issue a written statement indicating whether or not in his judgment said reports adequately and properly comply with the provisions of this section.

"For the purposes of carrying out the provisions of this section, funds made available for the purpose of design of or planning or performing said work, project or activity shall be available and may be expended for the research, preparation and publication of the reports required by this section and expenses incidental thereto, and said funds may be transferred or otherwise may be made available to other state departments and resource agencies designated by the Secretary of Environmental Affairs for the purpose of meeting the expenses incurred in evaluating the draft or final impact report.

"Section 3. Section 61 of Chapter 30 of the Massachusetts General Laws, inserted by Section 2 of this Act, shall take effect on December 31, 1972, and Section 62 of said Chapter 30, inserted by said Section 2, shall take effect on July 1, 1973."

B. Attention is directed also to the National Environmental Policy Act of 1969, Public Law 91-190.

ARTICLE II
General Provisions

§ 159-3. Definitions.

As used in this chapter, the following terms shall have the meanings indicated:

APPLICANT or SUBDIVIDER — The owner of record of the tract of land to be subdivided, or his agent duly authorized in writing.

BOARD — The Planning Board of the Town of Agawam.

LOT — An area of land in one ownership, with definite boundaries, used or available for use as the site of a principal building and its accessory buildings. A "lot" within a subdivision shall mean such an area whose boundaries are recorded and which area has no interior division.

SUBDIVISION — The division of a tract of land into two or more lots in such manner as to require provisions for one or more new ways not in existence when the Subdivision Control Law[1] became effective in the Town of Agawam to furnish access for vehicular traffic to one or more such lots, and shall include resubdivision and, when appropriate to the context, shall relate to the process of subdivision of the land or territory subdivided.

§ 159-4. Plan believed not to require approval.

A. Any person who wishes to cause to be recorded in the Registry of Deeds or to be filed with the Land Court a plan of land and who believes that his plan does not require approval under the Subdivision Control Law may submit his plan, two originals and two copies, minimum, and application Form A[2] to the Planning Board accompanied by the necessary evidence to show that the plan does not require approval. Said person shall file, by delivery or registered mail, a notice with the Town Clerk stating the date of submission for such determination and accompanied by a copy of said application. A filing fee of $35 shall accompany the application. **[Amended 4-5-1990]**

B. Said plan shall be at a scale no smaller than one inch equals 40 feet and shall be 24 inches by 36 inches or 18 inches by 24 inches in size and shall show all existing structures and their relationship to the proposed property lines. The plan shall be of such sheet size and layout so as to conform to the regulations of the Registry of Deeds. A block space, 3.5 inches wide by four inches high, shall be available adjacent to the right on the bottom margin for the endorsement of the Planning Board.

C. If the Board determines that the plan does not require approval, it shall without a public hearing and within 21 days of the submission endorse on the plan the words "Planning Board Approval Under Subdivision

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1. **Editor's Note: See MGL c. 41, § 81K through 81GG, inclusive.**
2. **Editor's Note: Form A is on file in the Planning Department offices.**

Control Law Not Required." Said plan shall be returned to the applicant, and the Board shall notify the Town Clerk of its actions.

D. If the Board determines that the plan does require approval under the Subdivision Control Law, it shall within 21 days of submission of said plan so inform the applicant and return the plan. The Board shall also notify the Town Clerk of its determination.

E. Any plan so endorsed shall be recorded with the Registry of Deeds within six months. Proof of recording shall be submitted to the Planning Board. Failure to record the plan within six months and provide proof of recording will negate the action of the Board. In addition, no building permit will be issued until a certified copy of the registered plan is received by the Agawam Department of Public Works. **[Amended 3-19-1992; 6-18-1992]**

§ 159-5. Submission of plans required; consent of Board required.

A. No person shall make a subdivision within the Town, or proceed with the improvement or sale of lots in a subdivision, or the construction of ways, or the installation of municipal services therein, unless and until a preliminary and definitive plan involved therefrom of such subdivision has been submitted to and approved by the Planning Board as hereinafter provided.

B. Not more than one building designed or available for use for dwelling purposes shall be erected or placed or converted to use as such on any lot in a subdivision, or elsewhere in the Town, without the consent of the Planning Board. The consent of the Board shall be conditional upon conformance with the applicable zoning ordinances[3] and the provision of adequate ways and utilities furnishing access to each site of such building the same as otherwise required for lots in a subdivision.

3. **Editor's Note: See Ch. 180, Zoning.**

ARTICLE III
Plan Submission and Approval Procedure

Applicants should be aware that land disturbance projects meeting the following thresholds are subject to the requirements of the Town of Agawam's Stormwater Management Ordinance and Regulations (Chapter 176, Article III of the General Ordinances):

- Administrative Review for Stormwater Management is required for new development or redevelopment projects that will create, individually or part of a common plan of development or sale, between 5,000 and up to but not including 43,560 square feet of disturbance.
- A Stormwater Management Permit is required for new development or redevelopment projects that will disturb 1 acre (43,560 square feet) or more of land or create 5,000 square feet or more of impervious cover. This includes construction activities for new development or redevelopment that disturb less than one acre if that disturbance is part of a larger common plan of development or sale that all together disturbs one or more acres.

For such projects, the Department of Public Works encourages applicants to attend at least one pre-application concept plan meeting. The meeting is intended to provide the applicant with advice and guidance relative to the approval process; and allow the applicant and Department of Public Works to have a preliminary conversation about the site, stormwater management and erosion control considerations, and concept plan. For this meeting, preparation of an existing resources /site analysis map, a soils map, and a voluntary sketch plan are all recommended. This concept plan meeting with the Department of Public Works shall precede the preliminary plan meeting described hereunder.

§ 159-6. Preliminary plan.

A. General.

(1) An application for approval of a preliminary plan of a subdivision shall be submitted to the Planning Board by the applicant, who is defined in § 159-3. The submission of such a preliminary plan will enable the subdivider, the Board, other municipal agencies and owners of property abutting the subdivision to discuss and clarify the problems of such subdivision before a definitive plan is prepared.

(2) A definitive plan will not be reviewed unless a preliminary plan has been submitted and subsequently approved. Rules and regulations in effect at the time of the definitive submission shall apply unless the definitive plan is submitted within seven months of the date of preliminary submission, in which case the rules and regulations in effect on the earlier date shall still apply.

B. Method of submission.

(1)

Commented [CM1]: Do you want to require a digital submission?

(2)

An application for approval of a preliminary plan shall be submitted within 14 days prior to the first regular meeting of the Board for that month. The application shall be placed on the agenda for review on the first regular meeting of the month. If the application is deemed incomplete, the Board, by vote, may reject the plan, and no further action shall be taken by the Board until the applicant resubmits an amended application. The decision shall be filed with the Town Clerk; the applicant shall be notified by certified mail.

Notice shall be given to the Town Clerk when the preliminary application is filed with the Planning Board. A filing fee of $25 plus $5 per acre or any part thereof shall accompany the application. Payment shall be made by check payable to the Town of Agawam. Should the application be determined to be incomplete, the fee shall be returned and all privileges shall be voided.

C. Contents of application.

(1) Preliminary submissions shall include the following:

(a) A completed Form B.[4]

(b) A statement of interest in the land by the applicant.[5]

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4. **Editor's Note: Form B is on file in the Planning Department offices.**
5. **Editor's Note: The statement of interest is on file in the Planning Department offices.**

(c) A location map of the site and surroundings sufficient to locate the site from existing intersections, pump stations, etc. The scale shall be one inch equals 1,200 feet.

(d) An environmental study. The environmental study need not be compiled by a professional agency. The applicant may make the observation and determinations himself, with such assistance from engineers, nursery men, etc. as is necessary for accuracy in the technical areas. Photographs to support the observations should be included. The short form contained in Chapter 30, § 62, of the Massachusetts Environmental Act may be used for guidance. The study shall be presented in report form with drawings or maps as needed for clarification. The study shall contain:

[1] The relationship of the proposed development to the Master Plan, Zoning Map, policies and controls for the affected area.

[2] Existing topography, water table, drainage features, natural geologic elements, stands or groves of trees, shrub rows or other wildlife habitats, scenic qualities, easements and rights above, on or under the land and the current nature of man's use of the area; a topographic sheet with existing and finished contours at two-foot intervals; spot elevations as needed. Contour lines shall extend at a minimum 30 feet beyond the property lines.

[3] The effect of the proposed development, both positive and negative, upon the environment, including consideration of those elements in Subsection C(1)(d)[2] above; visual, including but not limited to aesthetic considerations and signs and architectural elevations; traffic, pedestrian and vehicular, within and in the surrounding areas servicing the proposal; solid waste containment and disposal; air and water quality; also radiation and hazardous substances control; historic architectural and archaeological preservation; and outdoor recreation, if involved in existing or proposed development. Does the proposal involve a filing under the Massachusetts Wetlands Protection Act, MGL c. 131, § 40?

(e) A preliminary plan, which shall include:

[1] A lot survey with existing easements, abutters and zone lines; existing streets abutting the proposal (type of street, see § 159-8B).

[2] A topographic plan showing:

[a] Existing contours at two-foot intervals extending at least 30 feet beyond the property lines.

[b]

[c]

Environmental elements, including such things as the following: all areas regulated by the Massachusetts Wetlands Protection Act, MGL c. 131, § 40, shall be verified by the Agawam Conservation Commission through a determination of applicability; existing stone walls, fences, existing buildings, trees with a diameter greater than eight inches measured five feet above the ground, shrub rows, rock ridges and outcroppings, water bodies; the location and limits of soil types, particularly Agricultural Soils, consistent with the soils classification maps prepared by the Natural Resources Conservation Service; areas where the depth of natural soil to bedrock is four (4) feet or less; the extent of any Interim Wellhead Protection Areas and Recharge Areas; delineation of slopes of 25% percent or greater; areas delineated as "Core Habitat" or "Critical Natural Landscape" on the Massachusetts BioMap2 Project developed by the Massachusetts Natural Heritage & Endangered Species Program; and any other noteworthy feature of the land.

Existing and proposed lines of streets, ways, sidewalks, trails, shared use paths, and easements and any public or common areas within the subdivision, in a general manner; spot grades on the center lines of streets (high spots, low point, intersection); indication of the types of streets. (See Article IV, Design Standards.)

[3] Indication of sewerage, water and surface water systems.

(f) An attested copy of the deed of the property.

(2) Plans shall be presented in one original plus four copies, minimum. Other documents shall be presented in two copies. One set will be returned to the applicant as endorsed.

D. Action of the Board. The Board shall confer with any boards or commissions which have an interest in the proposal. Within 45 days after submission of a preliminary plan, the Board shall approve, approve with amendments or disapprove the plan. The applicant shall be notified by certified mail. The Town Clerk also shall be notified. In the case of disapproval, the Board shall state in detail its reasons therefor. Section 81S of Chapter 40 of the Massachusetts General Laws shall apply. The Planning Board shall also notify abutters to the proposal of the submission and shall have the submission available for their review at the Town Hall.

§ 159-7. Definitive plan.

A. Timing.

(1) No person shall submit a definitive plan of a subdivision to the Planning Board for approval unless a preliminary plan has been approved by the Board. The definitive plan shall not vary substantially from the approved preliminary plan.

(2) The definitive plan shall conform to the applicable Zoning Ordinance.

(3) Stormwater Management and Erosion and Sediment Control Permit
An Application for a Stormwater Management and Erosion and Sediment Control

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Commented [CM3]: This proposed rephrasing is to emphasize pedestrian, multi-modal, etc. accommodations in addition to streets

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Permit, in accordance with Chapter 176 Article III of the Town of Agawam's General Ordinance, along with all required plans and supportive information and documentation, must be submitted as part of the Definitive Subdivision Plan submission approval. No work shall commence on the construction of an approved Definitive Subdivision Plan until a Stormwater Management Permit has been approved and issued. Wherever possible the proposed drainage system shall be designed to utilize, and be compatible with, the existing drainage patterns and existing natural features of the site.

B. Method of submission.

(1) An application for approval of a definitive plan shall be submitted within 14 days prior to the second regular meeting of the Board for the month.

(2) The application shall be placed on the agenda for submission review on the second regular meeting of the month. If the application is deemed incomplete, the applicant will be notified by certified mail that the plans will not be further reviewed and that after the required public hearing the Board, by vote, may reject the plans due to improper submission.

(3) If, prior to the public hearing, the applicant completes the application, the amended submission shall be accompanied by a request for an appropriate extension of time.

(4) The applicant shall file by delivery or registered mail a notice with the Town Clerk stating the date of application for such approval and accompanied by a copy of the complete application (Form C).[6]

(5) A filing fee of $150 plus $60 per acre or any part thereof shall accompany the application. Payment shall be by check payable to the Town of Agawam.

(6) Land which is to be secured by conservation easement or deeded to the Town as public open space and is so indicated on the plan shall not be subject to the acreage filing fee.

C. Contents of application. Submission of a definitive plan application shall include all of the mapping elements required in the preliminary plan submission, in addition to the following

(1) A statement of interest in the land by the applicant.[7]

(2) An attested copy of the deed of the property.

(3) An updated environmental study (reference to previous study and to include any changes which have occurred in the time interval).

(4) Final plans and specifications as required:

(a) A title sheet showing the index to drawings and a location map at a scale of one inch equals 1,200 feet.

(b) A lot survey with road layout and lot lines suitable for filing with the Registry of Deeds. See Subsection G(2). Roadway layout, roadway center line, and property lines shall be tied into the Agawam Coordinate System. Coordinate traverse point locations can be obtained from the Engineering Division. After the definitive plan is approved, the applicant shall provide the Engineering Division with a computer disk containing the following: Coordinates of roadway layout and center line data, property line data, and all plan and profile drawings. The computer disk shall be supplied in an AutoCAD or DXF format, unless otherwise specified by the City Engineer. **[Amended 12-5-1996]**

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6. **Editor's Note: Form C is on file in the Planning Department offices.**
7. **Editor's Note: The statement of interest is on file in the Planning Department offices.**

(c) A topographic sheet with existing and finished contours at two-foot intervals; spot elevations as needed. Contour lines shall extend at a minimum 30 feet beyond the property lines. Center lines of roads with stations and elevations shall be shown. Where septic tanks and leach fields are being used, areas of leach fields shall be shown by spot elevations. The general location of proposed buildings shall also appear on this plan, and the finished grade of land at the four corners.

(d) Existing and proposed lines of streets, sidewalks, shared use paths, rights of way, easements, public or common areas within the subdivision, and utilities. (See Article IV.) Curb cuts and driveways within the street line shall be shown. Proposed names of new streets shall be shown.

Detail sheets as needed.

(e)

(5) A statement of the time-development sequence.

(6) A plan showing the sequence of development. All bonding must conform to these divisions.

(7) A Town-development relationship study, for information purposes only:

(a) The impact on utilities and services which will be required to service the development.

(b) The tentative sale price of houses, type of housing and square footage of finished living space per unit.

(8) A report of test borings and soil samples, water table tests and soil absorption tests (percolation tests):

(a) Borings and soil samples. Borings and soil tests shall be made by a reputable soil testing firm approved by the Town Engineer. Borings shall be made in general every 250 feet along the center line of each roadway or closer if required by the Town Engineer and in easements at the discretion of the Town Engineer. The borings shall extend to a depth of one foot below the deepest utility. The borings should be shown on the profiles of the construction plans and should indicate the type of soil and the depths at which they are encountered, the standard penetration resistance (N) of each type of soil and the elevation of the water table. In addition, soil samples shall be taken at the street borings of the material which will form the subgrade of the proposed roadways. A sieve analysis shall be made of these samples with the percent passing the one-half-inch, No. 4, No. 10, No. 40 and No. 200 sieves being reported. Also, the liquid limit, plasticity index and group index of the samples shall be determined and reported. The developer may provide

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test pit logs from backhoe-dug test pits at the above-described locations. These test pits will be provided at the developer's

option and will not necessarily relieve him of the requirements for penetration tests and samples noted above.

(b) Soil absorbency tests and water table observation tests.

[1] All percolation tests (soil absorbency tests) shall be made at the final location and elevation of the proposed leaching field and wherever else determined by the Town Engineer. All tests will only be performed during the period of April 1 to June 15, provided that all frost is out of the ground. Soil with a percolation rate of over 15 minutes per inch shall not be suitable for septic tanks and leach fields. Soil with a percolation rate of over one minute per inch shall be unsuitable for subsurface leaching fields and street drains. A groundwater observation hole a minimum of seven feet in depth must be measured from the elevation of the property after finished grading. All tests must be made in the presence of the Town Engineer or his agent. Where the test is to be made in filled ground for sanitary sewerage disposal purposes, the fill must be in place at least six months prior to the date on which the test is made. Tests made under this section may be utilized by the Board of Health, provided that any additional requirements of that Board have been complied with.

[2] Plans shall be presented in two sets of original or reproducible drawings and five sets of copies. All other documents shall be presented in three copies. One set of original plans and one copy of other documents will be returned to the applicant as endorsed.

D. Preparation of definitive plan. The definitive plan shall be prepared by an engineer and/or surveyor and shall be clearly and legibly drawn in black India ink upon Mylar. The plan shall be at a scale of one inch equals 40 feet or such other scale as the Board may accept to show true bearings, curve data and accurate dimensions. Sheet sizes shall not exceed twenty-four by thirty-six (24 x 36) inches. The definitive plan shall contain the following information:

(1) The subdivision name, boundaries, North point, date and scale.

(2) The name and address of the record owner, subdivider and engineer or surveyor who shall indicate by stamp registration in the Commonwealth of Massachusetts.

(3) The names of all abutters as they appear on the most recent tax list.

(4) The existing and proposed lines of streets, ways, lots, easements and public or common areas within the subdivision. (The proposed names of proposed streets shall be shown in pencil until they have been approved by the Board.) Contents of titles, covenants

and easements shall be reproduced in full either on the plan or appended thereto.

(5) Sufficient data to determine the location, direction and length of every street and way line, lot line and boundary line and to establish these lines on the ground.

(6) The locations of all permanent monuments properly identified as to whether existing or proposed.

(7) The locations, names and present widths of streets bounding, approaching or within reasonable proximity of the subdivision.

(8) Suitable space to record the action of the Board and the signatures of the members of the Board (or officially authorized person). The block shall be three and five-tenths by seven (3.5 x 7) inches, minimum.

(9) Existing and proposed topography at two-foot contour intervals as required by the Board.

(10) Profiles on the center lines of proposed streets at a horizontal scale of one inch equals 40 feet and vertical scale of one inch equals four feet, or such other scales acceptable to the Board. All elevations shall refer to the Town datum. A minimum of one bench mark shall be provided based upon Town (United States Geological Survey, National Geodetic Vertical Datum) datum.

(11) The proposed layout of storm drainage, public water supply and public sewage disposal systems. If wells and/or septic tanks and leach fields are intended to be utilized, these shall be shown by general indication of location with spot elevations on the finished grading sheet. The Board of Health reserves the right to make final determination concerning location and specifications of private water and sewage systems.

E. Review by Board of Health as to suitability of the land.

(1) The Planning Board shall, within 10 days after submission of a plan, consult with the Board of Health. If the Board of Health is in doubt as to whether any of the land in the subdivision can be used as building sites without injury to the public health, it shall so notify the Planning Board, in writing, within 30 days. Any approval of the plan by the Planning Board shall then only be given on the condition that the lots or land as to which such doubt exists shall not be built upon without prior consent of the Board of Health, and shall endorse on the plan such condition, specifying the lots or land to which said condition applies.

(2) The data obtained in § 159-7C(7) shall be submitted by the Planning Board to the Board of Health for its review.

(3) Any lot so located that it cannot be served by a connection to the municipal sewer system shall be provided with a septic tank and drain field satisfactory to the Board of Health.

F. Public hearings. Before approval of a definitive plan is given, a public hearing shall be held by the Planning Board. Notice of such hearing shall be given by the Board at least 14 days prior thereto by advertising in an official publication of, or in a newspaper of general circulation in, the Town of Agawam. A copy of said notice shall be mailed to the applicant and to all owners of land abutting the subdivision and within 500 feet of it, as appearing in the most recent tax list. A petition for a change of zone when necessary shall be entered and heard concurrently with the subdivision approval hearing if the Council has referred a zone change request back to the Board. The Planning Board may notify the Pioneer Valley Planning Commission (PVPC) and abutting communities if the proposal would have regional significance.

G. Action of the Board; approval or disapproval.

(1) Board action.

(a) The Planning Board shall confer with any boards or commissions which have an interest in the proposal. The action of the Board in respect to such plan shall be by vote. The certificate of such action shall be filed with the Town Clerk and sent by registered mail to the applicant.

(b) After the public hearing as required above, the Board shall approve or, if the plan does not comply with the Subdivision Control Law or the rules and regulations of the Planning Board or the recommendation of the Board of Health or its agent, shall approve with modification or disapprove such plan. In the event of disapproval, the Planning Board shall state in detail wherein the plan does not conform to the rules and regulations of the Board or to the recommendation of the Board of Health or its agent, and the Board shall revoke its disapproval and approve the plan which, amended, conforms to such rules and regulations or recommendations. Final approval, if granted, shall be on the condition that the plan meets approval under the Wetlands Act, MGL c. 131, § 40.

(c) Final approval, if granted, shall be endorsed on the original drawing of the definitive plan by the signatures of a majority of the Board, but not until the statutory twenty-day appeal period has elapsed following the filing of the certificate of the action of the Board with the Town Clerk, and said Clerk has notified the Board that no appeal has been filed. After the definitive plan has been approved and endorsed, the applicant shall furnish the Board with three extra endorsed lot layout sheets and the book and page of the Registry of Deeds (and/or Land Court) where such plan is recorded.

(2) Rescission of approval.

(a) A covenant filed with the Registry of Deeds and described in Subsection H below shall contain the following statement: "The construction of all ways and the installation of all municipal services shall be completed in accordance with the applicable rules and regulations of the Board within _____ months from date of endorsement. Failure to so comply shall automatically rescind approval of this plan."

(b) Time shall be determined from the time-development sequence.

(c) Any bond allowed under Subsection H below shall be drawn to accomplish the intent and purpose of this section. Promptly, the applicant shall furnish the Planning Board with the book and page of the Registry of Deeds (and/or Land Court) wherein the covenant is recorded.

H. Performance guaranty. Before endorsement of approval on the definitive plan, the Board shall require the guaranty of installation of all work required by this regulation which shall be performed by the applicant or his agent by a covenant running with the land which shall be filed with the Registry of Deeds, or by posting of bond or depositing moneys with the Town Treasurer.

(1) Covenant. [See Subsection G(2) above.]

(a) Such covenant shall state that no lot in the subdivision shall be conveyed other than by mortgage deed and no building shall be erected thereon until the improvements specified in the regulations are constructed and installed so as to serve the lots adequately. Such condition shall be endorsed upon the plan or contained in a separate vote or agreement which shall be referred to on the plan and recorded in the Registry of Deeds. When the applicant has completed the required improvements specified in the regulations, including the documents for street acceptance (Subsection J), for any lots in a subdivision, he may request a release of the covenant for said lots. If the improvements have been completed to the satisfaction of the Board, the Board will then execute and deliver to the applicant such release, which shall be in the form for recording in the Registry of Deeds. The Planning Board may require a deposit of security (cash only) and agreement to guarantee the performance of the work until the lots are improved. Thereafter the conditions relating to such lots so released shall terminate.

(b) The applicant shall furnish the Board with one copy of the recorded covenant.

(2) Bond.

(a) The applicant may elect to post a performance bond for part or all of the work to be accomplished according to the plan showing sequence of development. The performance bond and/or deposit money shall be an amount determined by the Board to be sufficient to cover the cost of all improvements specified in these regulations for the division of work and as described in a related bond agreement. All surety bonds shall be submitted to the Counsel from the Planning Board for approval as to form prior to submission to the Town Treasurer for approval as to sufficiency and custody. Bonds shall be written for the time required as specified in the time-sequence of development statement and related bond agreement.

(b) Pump station; utility services; binding of corporations.

[1] If a pump station is included in the definitive plan, this work shall be secured separately and completed as to operational capacity, standby power and warning system before a covenant relating to any lots shall be released.

[2] The utility services, gravel base and base coat of blacktop shall be accomplished under covenant, cash security or a security bond (such bond in an amount twice the amount of cash security needed). The remainder of the work shall be secured by cash security or by a security bond (such bond in an amount twice the amount of cash security needed). The amount of security specified shall include reasonable attorney's fees and related engineering costs.

[3] Corporate owners shall produce proper authority for the signer of the performance agreement to bind the corporation, and the corporation major stockholder shall bind himself personally to the terms of the performance agreement.

(3) Extension of time. If the time schedule is altered, notice must be given to the Planning Board which, at its discretion, may extend the time of completion, provided that any securities then held by the Town must be reviewed and increased as necessary to cover any increased cost of improvements. As part of the increased costs, the cost increment due to inflation of construction costs shall be added to the bond or cash security posted by the applicant. The Engineering News Record Construction Cost or similar index most accurately reflecting Agawam's liability, as determined by the City Engineer, will be used to arrive at the increased construction cost. **[Amended 12-5-1996]**

(4) Upon request, partial release of securities shall be made upon acceptance by the Board of the work completed.

(5) Building lot bond. A performance bond will be required of contractors or other parties constructing residences upon vacant lots where curbs, sidewalks, treebelts and other municipal facilities have been placed at the lot frontage. The requirements for this bond shall conform to the applicable provisions of Subsection H(2) of these regulations. The bond amount shall be based upon the potential damage of Town facilities plus administrative costs. It shall be the responsibility of the developer to ensure that all permitted but uncompleted residences existing in the subdivision at the time of subdivision bond release have proper building lot bonds.

(6) Inspection fee. **[Added 3-21-1991]**

(a) There shall be a fee instituted to pay for the costs of inspection. The fee shall be based upon the linear footage of roadway, water lines, sewer lines and drainage lines. The footage shall be as measured on the approved definitive plans. Any substantial increase in constructed footages over the plan footage shall result in a prorated increase in fee. Roadways shall be measured along the center line, from its beginning intersection with an existing street layout line or other beginning point to the final intersection with another street or existing layout line, so as to encompass all proposed rights-of-way. Culs-de-sac shall be measured on the basis of a center line extending straight through the center of the cul-de-sac to the far edge of the layout. Water line connections and building sewers in the right-of-way will not be included in the measurement for fee determination, except where their length exceeds 40 feet.

(b) The unit rate of inspection fee levied shall be $0.75 per linear foot measured on each of the four categories cited above. The total inspection fee shall be equal to the unit rate times the total footage of each line category of inspection (roadway, water, sewer and drain lines) as measured by the City Engineer. The fees described above must be paid prior to the commencement of construction, but these fees need only be paid beforehand for the particular phase of work to be undertaken, e.g., roadway, sewer, water or drain. When warranted by inflation or other factors, the unit inspection fee will be increased as proposed by the Agawam Department of Public Works and approved by the Planning Board.

I. Notification of completion. Upon completion of the subdivision, the applicant shall notify the Planning Board that the subdivision is ready for final inspection with respect to the removal of the bond.

J. Documents for acceptance of street by Council.

(1) Upon completion of the subdivision, the applicant shall provide the Town with an as-built plan suitable for presenting to the Town Council for acceptance of the street. Remaining securities held by the Town will not be released until an as-built plan has been certified by the Board as completed for submission to the Council.

(2) The applicant shall provide the Town with a standard hold-harmless agreement regarding any claims created by virtue of any actions taken by the developer and a statement from the applicant that he gives up the right to any claims he may hold within the development.

ARTICLE IV

Further Options for Identifying Controlling Standards:

Agawam may consider citing other design specifications or technical guidelines for developers to adhere to, including any locally adopted documents or regionally appropriate guides. Examples include:

- River and Stream Continuity Partnership "Massachusetts River and Stream Crossing Standards"
- Alta Planning & Design "Urban, Rural and Suburban Complete Streets Design Manual"
- Pioneer Valley Planning Commission "Valley Vision II Toolbox LID Design Standards"
- Massachusetts Office of Coastal Zone Management "The Practice of Low Impact Development"
- *Other documents deemed appropriate by the Town*

Design Standards

§ 159-8. Streets.

A. Location and alignment.

(1) All streets in the subdivision shall be designed so that, in the opinion of the Board, they will provide safe vehicular travel and discourage nonterminal traffic and excessive speed. Due consideration shall also be given by the subdivider to the attractiveness of the street layout in order to obtain the maximum livability and amenity of the subdivision.

(2) The proposed streets shall conform to the master or study plan when adopted in whole or in part by the Board.

(3) Provision satisfactory to the Board shall be made for the proper projection of streets, or for access to adjoining property which is not yet subdivided.

(4) Reserve strips prohibiting access to streets or adjoining property shall not be permitted.

(5) Streets shall be laid out so as to intersect as nearly as possible at right angles. No street shall intersect any other street at less than 60°.

(6) The minimum distance between adjacent parallel streets is 300 feet at intersections. This provision shall include streets on both sides of the street intersected. There shall be no offsets at intersections with four or more legs. **[Amended 3-21-1991]**

(7) No new streets shall be designed so as to create zoning violations. **[Added 4-5-1990]**

B. Type of streets.

(1) Any proposed street shall be indicated on the plans as being one of

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Reductions in frontage distances may be allowed at the Planning Board's discretion along the outside sideline of curved streets and cul-de-sacs to increase the number of homes per unit length and to minimize overall street length.

the following classes:

(a) Place: These streets shall be not over 500 feet in length, unless otherwise allowed by the Board, with no allowance for future extension. A maximum average daily traffic (ADT) of 100 vehicles per day will be allowed for a street to be classified as a place.

(b) Lane: The major purpose of these streets shall be to provide access to lots. They would be streets not subject to nonterminal traffic. The ADT for this type of street would be between 100 and 400 vehicles per day.

Options for Climate Smart and LID Street Layout:

5.1.1.3 Streets shall be located and designed to maintain and preserve natural topography (avoiding low areas and steep slopes in particular), significant landmarks, and trees; to minimize cut and fill; and to preserve and enhance views and vistas on or off the subject parcel.

5.1.1.4 Developers are encouraged to lay out streets along east-west or north-south axes in order to allow building siting to take advantages of passive solar heat gain and accommodate future solar electric installations on south-facing roofs.

5.1.1.4 Developers should consider “green alleys” and “shared streets” options with LID.

Commented [CM6]: This should be located after A.3 above, but the formatting within this PDF converted to Word document makes it too difficult to insert there currently.

(c) Subcollector: The ADT for this type of street would be between 400 and 1,000 vehicles per day. For the most part this type of street will serve several places or lanes.

(d) Collector: The ADT for this type of street would be between 1,000 and 3,000 vehicles per day.

(e) Arterial: The ADT for this type of street would be over 3,000 vehicles per day.

(2) The ADT of a street shall be determined by applying a factor of 10 vehicles per day per lot served either directly or indirectly by the street plus an allowance for through traffic where applicable. The classification of each street in a subdivision and an estimate of its ADT should be included in or with the plans. The Planning Board reserves the right to make the final decision regarding the classification of a street and its estimated ADT. Consideration must be given to future traffic from undeveloped land which would be served by the proposed street system.

C. Design requirements. See Table 4.1.[8]

D. Intersections. The intersection of places and lanes with other streets shall have a property line radius of 15 feet and a curbline radius of 25 feet. The intersections of all other streets shall have a property line radius of 25 feet and a curb radius of 35 feet. The Planning Board reserves the right to increase these radii wherever it may deem necessary for public safety. Maximum grade allowed within 100 feet of an intersection, measured from the outer gutter line, is 2.5%. **[Amended 3-21-1991]**

E. Dead-end streets. **[Amended 3-15-2001]**

Commented [P7]: Design standards in this table, dating from 1996, create a lot of impervious surface. May be better to align more closely with standards in table from *Sustainable Neighborhood Road Design Guidebook for MA*; MA 527 CMR Fire Code, Section 18.2.3.4.1.1 Fire department access roads shall have an unobstructed width of not less than 20 feet (6.1 m). Fire department access roads constructed in the boulevard-style shall be allowed where each lane is less than 20 feet but not less than ten feet when they do not provide access to a building or structure.

Connected road network is of great importance to functioning and efficient road network, reducing response time for public safety officials. Dead end streets should be discouraged unless sites specific conditions such as existing development, environmental constraint (slope, wetland, riparian body, etc.) or other constraint (railroad right-of-way, and lot configuration) create practical needs for their use. Dead ends encourage reliance on vehicular transportation for even short distances, as more direct connections are precluded by the geometry, which necessitates long travel distances even to physically-nearby locations. This increases fuel consumption and vehicle emissions and has negative effects on health by reducing walking and cycling rates.

Consider adding:

(1) Dead-end streets are discouraged. Developers should make every effort to avoid the creation of dead-end streets and should connect

proposed subdivisions to existing dead end streets wherever reasonable and practicable.

A developer may demonstrate that a dead end street is appropriate when they can demonstrate that a future connection to an existing street is not possible or practicable, or when the surrounding property will never need a street connection because of extremely sensitive or permanently protected natural resources. In this situation the project must provide a viable pedestrian and bicycle connection to the surrounding property as appropriate.

(1) "Dead-end streets" for the purpose of these regulations is a street meeting the design criteria for either a place, lane, subcollector, collector, or arterial which has only one means of access/egress.

(2) Dead-end streets shall not be longer than 500 feet measured from the nearest intersecting through street unless, in the opinion of the Board, a greater length is necessitated by topography or other local conditions.

(3) In order for a street not to be considered a dead-end street, there shall be at least two means of egress on to through streets. The two means of access/egress shall be separated by the distance of at least 300 feet.

(4) Dead-end streets shall be provided at the closed end with either:

- a turnaround having an outside roadway diameter of at least 100 feet and a property line diameter of at least 120 feet.
- A hammerhead turnaround having a thirty (30) foot minimum curb radii; forty-five (45) foot minimum center lane radii, a head adequate for three point turn maximum, and a (length to accommodate local firefighting vehicle).

LID Option for dead-end streets with turn-arounds: *Consider the following addition to 159-8.E.(4):*

All dead-end streets with turnaround islands are encouraged to be planted with trees and/or other vegetation or left with natural tree growth in lieu of paving the entire area of the island. The maintenance of the inner circle shall be the responsibility of developers, their successors and assigns, or a homeowners' association.

Where soils are conducive to infiltration (Natural Resource Conservation Service hydrologic soils group A or B), the center island may serve as a stormwater bioretention area with notched or perforated curbing to allow for entry of storm flow. Invisible curbing, where granite curbing forms an at-grade edge with the asphalt, is permitted in this situation.

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Commented [P8]: What is the reason for such a large radius? Sustainable Neighborhood Road Design recommends 50 foot outside radius. Massachusetts Fire Code 527 CMR requires 20 foot drive lanes and minimum inside turning radius of 25 feet. (Section 18.2.3.4.3.1)

Commented [CM9]: Hammerheads use less paved area overall

8. **Editor's Note: Table 4.1 is included at the end of this chapter.**

(5) Minimum gutter grades on culs-de-sac will be 1.00%.

§ 159-9. Typical cross section.

A typical cross section can be found in Figure 4.2.[9]

Commented [P10]: Maybe do for each street type indicated above?

§ 159-10. Easements.

A. Easements for proposed or future utilities across lots or centered on rear or side lot lines shall be provided and shall be at least 20 feet wide with provisions made for access thereto.

Commented [P11]: Important to consider how wide this makes the ROW.

B. Where a subdivision is traversed by a watercourse, drainageway, channel or stream, a stormwater easement or drainage right-of-way 30 feet in width shall be provided. In addition to providing for construction, maintenance and access, said easements shall contain flowage rights. In the event that a stream is of a seasonal nature or the exact course cannot be determined, then total flowage rights across the land in question shall be provided.

C. When, in the opinion of the Planning Board, pedestrianways or bicycle paths should be provided to connect with adjacent land, an easement (or deed) shall be granted to the Town for such purpose. To the greatest extent possible, pedestrianway easements shall coincide with those of underground utilities.

§ 159-11. Sewerage.

A. Wherever possible, sanitary sewers shall be installed to serve a proposed subdivision. The sewers shall be designed so that the velocity of the flow will be at least two feet per second during periods of peak flow. The sizing of sanitary sewers shall be as specified in the Sanitary Sewer Study for the Town of Agawam, 1972, by Tighe & Bond and/or as approved by the Town Engineer. The total design of the system shall also meet with the approval of the Town Engineer.

B. In areas where sanitary sewers are not presently available but where provisions are made for their future construction in the Sanitary Sewer Study and the Town's capital budget program, then a capped sanitary system, including laterals, shall be installed.

C. Sewage pumping stations or lift stations, where necessary and allowed, shall meet with the approval of the Town Engineer. In general these stations will only be allowed where called for in the Sanitary Sewer Study. In some cases stations other than those shown in the study will be allowed if it can be demonstrated that the station will be able to be eliminated by trunk sewer construction in the foreseeable future. The costs of operating and maintaining a station shall not be assumed by

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9. **Editor's Note: Figure 4.2 is included at the end of this chapter.**

the Town until one year from the date of completion of the last house in the last section of the subdivision.

D. The sewer lateral to each lot shall be shown on the plans. During the time the applicant is responsible for the station he shall enter into an agreement with the Town of Agawam relative to its maintenance and operation.

§ 159-12. Drainage.

Land disturbance projects meeting the following thresholds are subject to the requirements of the Town of Agawam's Stormwater Management Ordinance and Regulations (Chapter 176, Article III of the General Ordinances):

- Administrative Review for Stormwater Management is required for new development or redevelopment projects that will create, individually or part of a common plan of development or sale, between 5,000 and up to but not including 43,560 square feet of disturbance.

- A Stormwater Management Permit is required for new development or redevelopment projects that will disturb 1 acre (43,560 square feet) or more of land or create 5,000 square feet or more of impervious cover. This includes construction activities for new development or redevelopment that disturb less than one acre if that disturbance is part of a larger common plan of development or sale that all together disturbs one or more acres.

~~A. A system of drains shall be installed to collect stormwater from the proposed streets and lots and to transmit the water to a point where it may be discharged in a natural watercourse or stream. The drains shall be designed to have a minimum velocity at design flow of three feet per second and a maximum velocity of 10 feet per second. The sizing of storm drains and culverts shall be as specified in the Report on Storm Drainage for the Town of Agawam by Tighe & Bond, 1972, and/or as approved by the Town Engineer.~~

~~B. In general, surface water from the lots shall not be deposited directly into the ways. The area within the setback line may be graded to drain toward the street line. All other surface water from individual lots shall be handled insofar as possible within the lots themselves. Developers shall provide for lot surface drainage by a system separate from drainage of the street, by the use of swales, culverts, retention ponds, yard drains and piping, riprapped outlets at the water body, etc., in a manner which shall protect the natural water table unless the lowering of the water table is necessary for the health of the occupants. Strict attention shall be paid to the relationship of leaching fields to surrounding grading. Surface water systems shall not connect into the road drainage system except by permission of the Board, in which case such condition shall be noted on the approved plan. The total design of the system shall also meet with the approval of the Town Engineer.~~

~~C. Where, in the opinion of the Town Engineer and/or Planning Board, the discharge of stormwater from a subdivision will alter the character~~

of a watercourse to overflow its banks (confines), then the applicant will be required to submit drainage and flowage easements along said watercourse to a point where it is determined by the Town Engineer and/or Planning Board that the effect of the stormwater drainage discharge will have a negligible effect on the watercourse. The easements and flowage rights shall be of such width to cover the extent of the suspected flooding. These easements and flowage rights will be required both within and outside of the boundaries of the proposed subdivision. The total design of the system shall also meet with the approval of the Town Engineer.

D. All subdivisions shall be constructed in conformance with the Town Storm Drainage Ordinance.[10] Detention ponds will be utilized as

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10. Editor's Note: See Art. VII of Ch. 175, Water and Sewers.

required, and each detention pond will be fenced except as otherwise required by the Department of Public Works. Construction standards shall comply with Department of Public Works Standards. No dry wells or leaching fields for the underground disposal of stormwater will be allowed. No stormwater holding ponds without positive surface outlets shall be allowed.

E. Lot grading plan procedures. The Town of Agawam requires the following procedure to be followed for lot grading plans for all subdivisions approved after January 1, 2004. **[Added 3-4-2004; amended 1-19-2006]**

(1) Review scope. This review/approval process will address drainage and runoff concerns for the lot in question, adjacent lots, and the subdivision as a whole only. The elevation of the foundation is reviewed for comparison to adjacent grades, and generally for comparison to adjacent homes. This review does not address the constructability of the foundation.

(2) Procedure overview.

(a) Step 1: Lot grading plan approval. The owner's engineer/surveyor submits information for review and approval to Agawam DPW Engineering. It is hoped that the owner is part of this process in order to expedite Step 2.

(b) Step 2: Builder/owner sign-off. The owner and builder send a letter to DPW indicating that the approved lot grading plan will be complied with during construction. The owner/builder sign-off, including all information shown in the sample letter, must be forwarded to DPW within one week after Step 1 is complete. The white form will be forwarded from DPW to the Building Department for the building permit after this step is complete.

(c) Step 3: Construction field check. The builder/owner will contact DPW Engineering to schedule a field check on the top of foundation wall to ensure compliance with the approved lot grading plan. The fee for this inspection is $70. The builder/owner must allow a forty-eight-hour window for DPW to perform the field check. DPW is available Monday through Friday 8:30 a.m. to 4:30 p.m. except holidays. The builder will be contacted by Agawam DPW with the results of the field check. Failure by the builder to comply with the approved lot grading plan will result in DPW notifying the Planning Board. The Planning Board will then request the Building Department to issue a stop-work order for the lot until a resolution can be agreed upon.

(d) Step 4: Upon completion of construction and prior to a certificate of occupancy being issued by the Inspector of Buildings, the builder/owner will submit an as-built plan to

~~the Inspection Services Department. The as-built plan shall be prepared by a registered land surveyor. Failure to submit the as-built plan shall result in a hold on the issuing of the certificate of occupancy. If the as-built plan shows deviation from the lot grading plan, the builder/owner will be required to receive approval for the new plan from the Planning Board prior to the issuance of a certificate of occupancy.~~

§ 159-13. Water.

A. Water mains and appurtenances such as hydrants, valves, blowoffs and air release valves shall be installed to serve all lots on each street in the subdivision. The sizing of water mains shall be as specified in the Water Distribution Study when completed and/or as required by the Town Engineer. In general the minimum size water main that will be allowed is an eight-inch-diameter line.

B. Hydrants shall be installed to provide fire protection to the subdivision. The maximum distance allowed between hydrants is 500 feet. Wherever possible, hydrants should be located at lot lines.

C. All intersections of water mains shall be fully valved. Also, main line valves shall be installed every 1,000 feet along a water main.

D. The water service connection to each lot shall be indicated on the plans. The total design of the system shall also meet with the approval of the Town Engineer.

§ 159-14. Other utilities.

Underground electric and telephone lines and gas mains, including service connections, shall be shown on the plans. The location of streetlighting standards shall be indicated on the plans and the lighting shall be of a type adopted for use in the Town of Agawam. The location and design of streetlighting systems shall meet the requirements of the Department of Public Works. Letters from respective utility companies shall be submitted to the Board indicating their approval of the utility design. All utilities (electric, telephone, cable TV, fiber optic, and all other conduits) should be located under the roadway so as to optimize use of the right of way area for swales and other stormwater management facilities, sidewalks, and street trees.

Commented [CM12]: How are utilities currently sited in subdivisions? Utilities placed under the roadway can reduce clearing of trees and allow for a more compact development footprint.

§ 159-15. Open spaces.

Before approval of a plan, the Board may also in proper cases require the plan to show a park or parks suitably located for playground or recreation purposes or for providing light and air. The park or parks shall not be unreasonable in area in relation to the land being subdivided and to the prospective uses of such land. The Board may, by appropriate endorsement on the plan, require that no building be erected upon such park or parks without its approval.

§ 159-16. Protection of natural features.

Strict regard shall be shown for all natural features, such as trees with diameter at breast height (DBH) of 8" or more, watercourses, scenic points, historic spots and similar community assets which, if preserved, will add attractiveness and value to the subdivision.

§ 159-17. Pedestrianways and bicycle paths.

Provisions for pedestrian and bicycle access shall be made in all subdivisions connecting public open space or commercial areas. When roads do not connect with the adjacent subdivisions or open land, such nonvehicular access shall be provided. The pedestrian/bike path shall be eight feet in paved width with a minimum easement or deeded width of 16 feet. All ways shall be clearly marked and landscaped to protect adjoining lot owners. Such ways shall be secured by easement or deeded to the Town.

ARTICLE V
Construction Standards and Required Improvements

§ 159-18. Department of Public Works Construction Standards; preconstruction conference. [Amended 12-5-1996]

A. The Town of Agawam Department of Public Works Construction Standards, as amended from time to time, shall apply to all subdivisions and are hereby incorporated herein by reference. The Town of Agawam Department of Public Works Construction Standards are on file and may be viewed at the offices of the Agawam City Clerk, Department of Public Works and Planning Department.

B. Prior to ordering materials or starting any construction, the subdivider together with his contractor and engineer (if applicable) shall arrange for a meeting with the Engineering Division and the City Planner. At this meeting, the rules for conducting construction operations in the subdivision and on city streets will be outlined and discussed. Notices to be given, methods and materials to be employed, how utility connections are to be made, fees required and other operational matters will be discussed.

§ 159-19. Street and roadway.

A. Each street or way shall be cleared of all stumps, brush, roots, boulders, like material and all trees not intended for preservation. Developers are encouraged to limit clearing within the right-of-way to the minimum necessary to construct the roadway, drainage, sidewalk, and utilities, and to maintain site lines. Under this approach, it is not required to clear and grub the entire right-of-way. Upon completion, developers shall ensure that soils intended to percolate groundwater are permeable and have not been compacted by construction vehicles.

Deleted: large

Commented [CM13]: Agrees with new SWM regulations

Commented [CM14]: Consider allowing alternative pedestrian / cycling pathways outside of the ROW to decentralize paving and less ROW width reqs

Commented [P15]: Do you want to add in this section? Where conditions are suitable (both soils and traffic volume) a project may opt to use porous asphalt for portions of a roadway. Design specifications from University of New Hampshire for porous asphalt should be followed. See: http://www.unh.edu/unhsc/sites/unh.edu.unhsc/files/UNHSC%20PA%20Spec%20update-%20 FEB-2014.pdf

Deleted: The entire area of

Deleted: e

Commented [CM16]: This sentence in conflict with recommended language below; rephrase. Meeting 4/23/21: Working Group decided to determine best phrasing when further, internal work on these r&r continues

B. All loam, clay, peat or other yielding material shall be removed beneath all street layouts to a depth specified by the Town Engineer and shall be replaced with a granular material acceptable to the Town Engineer.

C. Whenever it is necessary to install fill to bring a roadway to subgrade, said fill shall be of a granular material satisfactory to the Town Engineer. All fill shall be placed in eight-inch layers compacted to not less than 95% of the maximum dry density, as specified in Section 150.62 of the Commonwealth of Massachusetts Department of Highways Standard Specifications for Highways and Bridges (MHD Specifications), as amended. **[Amended 12-5-1996]**

D. Wherever the borings indicate a groundwater within four feet of the proposed roadway surface or wherever the soil particle size indicates the possibility of a capillary rise of water in the subgrade soil, subdrains shall be installed under both shoulders of the roadway. The design and depth of the subdrain shall meet with the approval of the Town Engineer.

E. Wherever rock, in the opinion of the Town Engineer, is encountered, it shall be excavated to a depth of four feet below the subgrade of the roadway for the full width of the street layout. The excavated rock shall be replaced with a granular material satisfactory to the Town Engineer.

F. Roadways shall be brought to the subgrade elevation prior to the installation of the water mains, storm drains, sanitary sewer or other utilities. Additional requirements for design of pavement for certain subgrade soils may be necessary.

G. The subgrade of the roadway shall be compacted to a density and by a method approved by the Town Engineer prior to the placing of the subbase or base of the roadway.

H. Gravel subbase. **[Amended 3-21-1991; 12-5-1996]**

(1) The material used for the gravel subbase shall be gravel approved by the City Engineer, which meets the Commonwealth of Massachusetts Department of Highways Standard Specifications for Highways and Bridges (MHD Specifications), as amended, Material Specification M 1.03.0 Type b (three-inch maximum size) and conforms to construction methods stipulated in Section 401.60, except that all courses shall be laid in depths not exceeding four inches compacted depth.

(2) The maximum size aggregate for subbase courses shall not exceed four inches. The cost of any soil tests needed to determine the suitability of a material for use as a subbase shall be borne by the developer.

(3) The gravel shall be spread and compacted in layers not exceeding six inches in depth compacted measurement. The gravel shall be compacted to the density specified in § 401 of the MHD Specifications.

I. Gravel base. The material used for gravel base shall be dense-graded crushed stone approved by the City Engineer, which meets MHD Specification M 201.7 for material and is placed in conformance with Section 402 for construction. All courses of gravel base shall be laid in depths not exceeding four inches compacted depth. **[Amended 3-21-1991; 12-5-1996]**

J. Pavement. The material used for the roadway finish course shall be Class I bituminous concrete Type I-1 applied in two courses. The material and work shall conform to § 460 of the MHD Specifications and shall meet with the approval of the Town Engineer. The installation of all subsurface utilities within the roadway shall be completed before placement of the first (binder) course. Where there is concern over possible settlement, the City Engineer may require one winter season to elapse between utility installation and top course pavement installation. In no event shall the interval between placement of binder course and top course of pavement exceed two years. The construction of bituminous concrete pavement shall terminate on November 15 and shall not be resumed prior to April 1 unless specifically allowed, in writing, by the Town Engineer. No paving shall be done when the air temperature in the shade is 40° F. or less nor where the material

Commented [CM17]: Allow for permeable pavement?

on which the pavement is to be placed contains frost. A tack coat of bitumen at the rate of 0.05 to 0.10 gallon per square yard shall be applied to the base course of pavement, all as determined be the City Engineer. Material and placement shall be as approved. The tack coat shall be only applied to the extent that it can be covered with the surface course within one day. **[Amended 12-5-1996]**

K. Roadway pavement design. Using soil information obtained as required in § 159-7C(8), a pavement design shall be prepared utilizing California bearing ratio values or equivalent values obtained for the subgrade. This will normally be required in clay, loam, peat or silt subgrade materials or as otherwise required by the Town Engineer. The design shall consider and employ, as needed, increased thickness of the gravel subbase, use of geotextile fabric and/or plastic grids, use of subdrains and other measures necessary. (See also Subsections C and E.) This design shall be included in the definitive plans submitted for review by the Planning Board. See Table 5.1[11] for minimum thickness of the gravel base, subbase and pavement.

L. Bituminous concrete curbs shall be installed on both sides of each roadway, except at intersections, using bituminous concrete Type I-1 and an approved curb forming machine, except as otherwise allowed in a LID or shared streets design. All curbs shall have a minimum reveal of six inches and shall be installed on a bituminous base. At driveways, all curbs shall be installed so as to return to the sidewalk. At intersections, Type VB granite curbing shall be installed along the arc of the curves. The granite curbing shall have a six-inch reveal and a width at the top of six inches. The curbing shall be set by a method approved by the City Engineer. **[Amended 4-5-1990; 12-5-1996]**

If pursuing LID design standards, curbs should either be eliminated or, when deemed necessary to protect the roadway edge, they should be perforated or invisible. Interrupted curbs are curbs with gaps that allow stormwater to move from the street through to a stormwater management facility, such as planters, swales, rain gardens, or tree filter boxes. Invisible curbs are buried along the street edge so as to allow stormwater to flow over into a stormwater management facility. All LID curb options should be implemented in connection with stormwater management facilities. In shared streets, curbs should either be eliminated or be invisible.

Commented [P18]: Add:
Where curbing is related to stormwater management facility, use of notched curbing or "invisible curbing" (where granite curbing surface is level with or just below grade of roadway edge) will allow storm flows to enter bioretention area. Design should be in accordance with…
We need some good design specifications to help with this. PVPC could do some research if makes sense to Town.

Commented [CM19]: Where curbing is needed, think about specifying granite curbing as a way to help keep roads narrow overall. (With asphalt curbing it is hard to plow to the curb since material can be easily damaged. The tendency is to account for this extra width needed in winter months.

§ 159-20. Sanitary sewers.

A. Sanitary sewer mains and laterals shall be polyvinyl chloride pipe conforming to ASTM D 3034-SDR 35. The minimum size for sewer mains shall be eight inches while the minimum size of sewer laterals shall be four inches.

B. All sanitary sewers, sewer force mains and sewer laterals shall be installed in first-class bedding and in accordance with the Department of Public Works Specifications. Sewers shall be installed to the line and

grade indicated on the plans.

C. Only precast concrete manholes of a design approved by the Town Engineer shall be installed on a sanitary sewer main. For the most part sanitary sewer manholes shall be installed no further than 300 feet apart and the sewer shall be laid in a straight line between manholes.

D. Before any sanitary sewer will be accepted by the Board, it must pass an infiltration or exfiltration test, at the discretion of the Town Engineer, made in accordance with the Department of Public Works

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11. Editor's Note: Table 5.1 is included at the end of this chapter.

Specifications. Said test will be made at the developer's expense and shall be made under the direction of the Town Engineer.

E. No groundwater or surface water shall be discharged into the sanitary sewer. No storm drain, foundation or cellar drain or roof leader may be connected to a sanitary sewer or sewer lateral.

F. Where rock is encountered, it shall be removed to a depth of one foot below the flowline of the sewer and the pipe laid in a properly compacted granular material approved by the Town Engineer.

G. Only granular material approved by the Town Engineer shall be used as backfill in any trench excavation.

§ 159-21. Drainage.

For all drainage design and performance standards, refer to the Town of Agawam's Stormwater Management Ordinance and Regulations, Article III of Chapter 176 of the General Ordinances.

A. Storm drains shall be reinforced concrete pipe conforming to ASTM C-76, Class 3 minimum, polyvinyl chloride pipe conforming to ASTM D3034, SDR35 or polyvinyl chloride ASTM F-794. Bedding for various types of storm drains shall be as approved by the Engineer.

B. All storm drains, including catch basin leaders and culverts, shall be installed in first-class bedding. All work and materials shall be in accordance with the Department of Public Works Specifications.

C. Precast concrete or concrete block manholes of a design approved by the Town Engineer shall be used on storm drains. In general the distance between manholes shall not be greater than 300 feet.

D. Catch basins in general shall be installed at intervals of not more than 300 feet on both sides of a roadway and at intersections as necessary. The basins shall be of the Connecticut Basin type and shall conform to the Department of Public Works Construction Standards or shall be approved by the Town Engineer. **[Amended 12-5-1996]**

Commented [CM20]: Consider requiring inlets / drains to have a notice regarding discharge to receiving waters?

E. Where rock is encountered, it shall be removed to a depth of one foot below the flowline of the drain and the pipe laid in a properly compacted granular material approved by the Town Engineer.

F. Only granular material approved by the Town Engineer shall be used as backfill in any trench excavation.

G. When warranted by local water table conditions, the Planning Board may require that foundation subdrains be installed by the developer.

§ 159-22. Water.

A. All water mains shall be installed using ductile iron pipe conforming to ANSI A21.51, Class 52, with full thickness cement lining conforming to ANSI A21.4.

B. The hydrants furnished shall meet the Town hydrant standards and shall be of a type currently being used by the Town.

C. Grate valves shall be of the New York pattern, Metropolitan-type openings to the left, counterclockwise.

D. All materials and work shall be in accordance with the specifications of the Department of Public Works. All water mains shall be installed in first-class bedding.

E. Before any water main will be accepted by the Board, it must pass a pressure and leakage test made in accordance with the Department of Public Works Specifications. Said test will be made at the developer's expense and shall be made under the direction of the Town Engineer. Water mains shall be disinfected and tested for total coliform at the developer's expense. Where the coliform test does not meet state standards, reflushing, disinfecting and retesting will be required at the developer's expense.

F. All water services to the lots shall be installed using Type K copper tubing at least 3/4 inch in diameter. The service connections shall have a corporation with shutoff at the main and a curb stop at the street line.

G. Where rock is encountered, it shall be removed to a depth of one foot below the flowline of the water mains and connections and the pipe laid in a properly compacted granular material approved by the Town Engineer.

H. Only granular material approved by the Town Engineer shall be used as backfill in any trench excavation.

§ 159-23. Sidewalks, and pedestrian and bicycle paths.

A. There shall be cement concrete sidewalks constructed on both sides of each street in the subdivision. The width of the sidewalks shall be as specified under the Design Standards for the various classes of streets. The construction must conform to the Town of Agawam Department of Public Works Specifications for Construction of Cement Concrete Sidewalks, April 1989. All materials and construction methods shall be as specified in the Department of Public Works Specifications. **[Amended 4-5-1990]** If the site permits infiltration, sidewalks may be constructed of permeable paving materials. If using permeable materials, the developer must work in consultation with the Department of Public Works and an engineer with experience in this field, and materials must be evaluated at regular intervals as they age. Pervious asphalt should be based on specifications such as those found in the University of New Hampshire Stormwater Center Design Specifications for Porous Asphalt Pavements and Infiltration Beds. Sidewalks or pedestrian areas may also be construct stormwater runoff to a swale or other BMP.

B. The width of the sidewalk shall be as specified under the Design Standards for the various classes of streets.

C. Pedestrianways and bicycle paths as shown on the plans shall be eight feet wide and constructed according to this section.

Commented [CM21]: Recommending pulling out into own section so you can more seamless address tree planting issues as well.

Deleted: tree belts

Commented [CM22]: See porous paving permission below. Permeable pavements provide increased traction when wet because water does not pool, and the need for salt, sand, and plowing is reduced during winter due to low/no black ice development. Compared to traditional paving methods, long-term maintenance costs may be lower in cold climates since permeable pavements resist cracking and buckling in freeze-thaw conditions. Nevertheless, permeable paving requires regular maintenance including: annual inspection of paver blocks for deterioration; periodic replacement of sand, gravel and vegetation; and annual industrial vacuuming of pavements to unclog sand and debris (Note: The use of sand in ice prevention should be avoided because it will clog pavement pores.) http://www.bostoncompletestreets.org/pdf/2/chap2_5_sidewalk_materials.pdf

Commented [P23]: Consider a context sensitive approach to RESIDENTIAL roads, or one determined by ADT. Pulled from Sustainable Neighborhood Road Design:

- **Place & Lane (<400 ADT)**: Cycling lanes: shared road, sidewalk shared road
- **Subcollector (400-1000 ADT)**: Cycling lanes: shared road, sidewalks 4 feet or shared road, as appropriate
- **Collector and Arterial (1000->3000)**: Cycling lanes: shared or up to 6'' wide, as appropriate; Sidewalk 1 side 4 ft

Commented [P24]: What are these standards?

Deleted: There shall be tree belts constructed on both sides of each street in the subdivision. ...

Deleted: Loam shall be placed to a minimum depth of six inches. Lime, fertilizer and grass seed shall be applied as required in the specifications of the Department of Public Works. The tree belts shall be reworked and reseeded until a stand of grass satisfactory to the Town Engineer has been established.¶

Commented [P27]: In A above, suggests the sidewalk width is different depending on street type. Is this number/requirement somehow separate?

§ 159-24. TREES & PLANTINGS

A. TREE PRESERVATION

Unless approved by the Planning Board, deciduous trees with a diameter of 8 inches at a height of 4.5 feet above the ground shall be preserved. The entire area within the drip line and critical root zone of preserved trees, including understory vegetation, shall be retained in an undisturbed state.

(1) Any trees recommended for preservation that are lost a result of and/or during construction shall be replaced.

(2) Transplanting methods that maximize plant survival shall be used.

(3) Prior to clearing, excavation, grading or other construction activities, all vegetation to be retained shall be surrounded by temporary protective fencing (i.e., orange construction fencing) or other measures. All trees on adjacent properties whose drip lines extend into the project site shall also be protected. Barriers shall be constructed outside the drip line and critical root zone of all vegetation to be protected.

(4) Materials shall not be stored within the drip line of trees to be protected.

(5) Additional best management practices shall be used to protect trees during construction (i.e., pruning, soil aeration, trunk wrapping, root pruning, watering, etc.).

(6) All protective measures shall be maintained until all construction work is completed, the site is stabilized and restored to a growing state and City staff gives final approval.

B. STREET TREES AND PLANTINGS IN TREE BELTS

(1) There shall be tree belts constructed on both sides of each street in the subdivision. Loam shall be placed to a minimum depth of six inches. Lime, fertilizer and grass seed shall be applied as required in the specifications of the Department of Public Works. The tree belts shall be reworked and reseeded until a stand of grass satisfactory to the Town Engineer has been established. The top six inches of tree belt shall consist of good quality loam extending to the right-of-way, screened, raked, and either rolled with lawn grass seed applied in sufficient quantity to assure adequate coverage, rolled when the loam is moist, or planted with low-growing no-mow type decorative grass/plants. Spreading of loam and seed shall be in accordance with Sections 751 and 765 of the MassDOT Standard Specifications for Highways and Bridges.

(2) When sidewalks are required, the tree belt shall be between the curb and the sidewalk, with the trees planted along the center line of the tree belt. The finished grade of such tree belts shall have a slope of ½ inch per foot toward the roadway. Where unusual physical land characteristics or topographic conditions exist, and where no sidewalk is to be constructed, the Planning Board may approve the construction of a tree belt of a greater slope with the finished slope not projecting above a plane sloped four horizontal to one vertical from the back of the curb.

Commented [CM28]: Agrees with SWM Regulations

Commented [CM29]: No standard for number, spacing, species, or sizing of trees…

Commented [P30]: Where are these specifications?

Commented [CM31]: The following text is extracted from the Model Subdivision language PVPC & working group developed in 2018. Compare with the above

Commented [CM32]: As currently depicted in Figure 4.2

Commented [CM33]: 1:32 in cross section figure 4.2 – preference for lesser slope?

(3) Shade trees of a species to be determined by the Tree Warden shall be planted along the side lines of the streets with the tree belts at intervals to be determined by the Board. The applicant shall be responsible for obtaining the full growing season for these trees or shall be responsible for replacing the tree with one at least equal in size to the tree being replaced and again guarantee for at least one full growing season.

(3) There shall be a minimum of two street trees for every lot frontage spaced 75' apart or as otherwise approved by the Planning Board.

(4) Large and medium height growing trees shall have a minimum 2 ½" trunk diameter, caliper measured at 4' above the ground. Small height growing trees (for placement under utility lines) shall have a 9' crown height and a 5' spread.

(5) Tree belts may include bioretention areas or other vegetated stormwater systems. Bioretention areas should utilize noninvasive species that are not on any Massachusetts invasive plant list, and that can tolerate cycles of drought and inundation. Bioretention areas should utilize Massachusetts Stormwater Management Standards.

C. **Shade trees.**

Commented [CM34]: Recommend grouping with other tree planting section above, suggested new section 159-24.

Deleted: § 159-26.

A. Before release of the covenant, the developer shall deposit with the Town of Agawam an amount of money sufficient to cover the replacement of two shade trees per lot according to the specifications of the Planning Board.

B. The developer shall be responsible for providing, planting and maintaining through one full year two living healthy trees or their substitutes per lot. Such trees shall be 2.5 inches minimum in diameter, balled and burlapped and planted in season and subject to direction of the Tree Warden. Types of trees shall be selected from a list available from the Planning Board which shall include native and hardy species readily available locally.

C. On each lot two shade trees shall be planted within 20 feet of the street line and located so as not to conflict with underground utilities and sight distances. On places at the discretion of the Tree Warden, shade trees may be planted on the tree belt within the street right-of-way.

Commented [CM35]: If requiring tree belts on each side of the road as specified in 159-23, do these two trees per lot need to be within 20' of the roadway? Would it be better to locate so that the trees shade dwellings?

§ 159-24. Utilities.

A. Streetlights shall be installed by the power company at the developer's expense, and the developer shall be responsible for the cost of lighting until the street is accepted by the Town. The streetlights and standards shall be of the type adopted by the Town as a standard installation. The lighting shall be installed on a street prior to occupancy of any house on that street.

B. All underground utilities, such as gas mains and electric and telephone lines, including service connections, shall be installed prior to the construction of the roadway surface, base or subbase. All methods used to install these utilities shall be subject to the approval of the Town Engineer. Only granular material approved by the Town Engineer shall be used as backfill in any utility trench.

§ 159-25. Inspections. [Amended 3-21-1991]

The developer shall notify the Department of Public Works in writing at least 48 hours in advance of the time when he plans to begin or resume any work on the improvements required in a subdivision. The Department of Public Works shall assign an inspector to inspect the work. The Town of Agawam shall charge the developer at the rate set by the Department of Public Works as specified in § 159-6H(6) for inspection work in the subdivision. No work shall be accepted by the Board which has not been inspected on a daily basis during its progress. Failure of the developer to notify the Department of Public Works or failure to have the work inspected on a daily basis as it progresses shall be cause for the Town to require the developer to excavate and reconstruct or do other things that may be required to ensure that the work has been done in a satisfactory manner. The presence of an inspector shall in no way relieve the developer from full responsibility for the required work. The Department of Public Works shall coordinate these inspections with the inspections required in the application for a Stormwater Management Permit, as specified in Article III and associated Regulations of Chapter 176 of the Town of Agawam's General Ordinances.

Commented [P36]: See suggestion in 159-14 Design Standards: Other Utilities for locating under the roadway

Commented [P37]: There are specific inspections required under SW Management bylaw. Need to coordinate these.

Deleted: § 159-26. Shade trees.¶

¶

A. Before release of the covenant, the developer shall deposit with the Town of Agawam an amount of money sufficient to cover the replacement of two shade trees per lot according to the specifications of the Planning Board.¶

¶

B. The developer shall be responsible for providing, planting and maintaining through one full year two living healthy trees or their substitutes per lot. Such trees shall be 2.5 inches minimum in diameter, balled and burlapped and planted in season and subject to direction of the Tree Warden. Types of trees shall be selected from a list available from the Planning Board which shall include native and hardy species readily available locally.¶

¶

C. On each lot two shade trees shall be planted within 20 feet of the street line and located so as not to conflict with underground utilities and sight distances. On places at the discretion of the Tree Warden, shade trees may be planted on the tree belt within the street right-of-way.¶

§ 159-27. Clearing and grading.

Refer to Chapter 176, Article III of the Town of Agawam's General Ordinances for requirements regarding clearing and grading of the project site.

§ 159-28. Loam or topsoil.

No loam or topsoil shall be removed from the property until the subdivision is complete, and then only with the permission of the Board of Appeals as specified in § 180-8G of Chapter 180, Zoning.

§ 159-29. Permits.

Upon receipt of permits from the Inspector of Buildings to construct dwellings, etc., each lot line must be clearly marked and lot identified by lot and street number before any inspections are made. Compliance with the Conservation Commission's regulations must be posted, if applicable.

§ 159-30. Excavations.

All excavations for pipe, etc., across streets and to dwellings shall be properly protected and lighted at proper times, according to recommendations of the Department of Public Works and the Chief of Police. These excavations shall be properly backfilled and well-compacted as soon after installation of pipe, etc., as is possible.

§ 159-31. Protection of natural features.

A. In any area outside the road right-of-way and building site (house plus 15 feet outside walls and leach field area), no tree over eight inches in diameter measured five feet above the ground shall be removed without the consent of the Tree Warden or his agent. Due regard shall be made for life expectancy and health of the vegetation and the final proposed grading. The developer shall notify the Tree Warden at least one week prior to any clearing of the site. No evergreen tree or shrub shall be removed without consent of the Tree Warden or his agent. Limits of work may be delineated on the definitive plan, in which case no work shall be performed, including clearing, outside those limits, but work within may proceed without further consent.

Deleted: To prevent wind and water erosion, the following measures must be employed on all sites:¶

¶

A. Regions of the site must be developed in separate increments so that the disturbed area is kept to a minimum. At no time is the entire area to be disturbed.¶

B. Natural vegetation shall be retained and protected whenever possible. C. All disturbed area shall be stabilized with a temporary vegetative cover¶ if to be left exposed for greater than one month, with the exception of¶ roadways which are to be treated with appropriate measures at the end of each workday.¶

¶

D. All stockpiled soils shall be stabilized with temporary vegetative cover.¶

B. All natural features to be preserved shall be suitably protected during construction.[12]

§ 159-32. Cleaning up.

Before final inspection, the total area shall be cleared of debris, both natural and construction materials generated by the construction.

§ 159-33. Monuments.

All proposed monuments shown on the definitive plan shall be installed and their installation shall be certified by the developer's engineer or surveyor. Monuments shall be of stone or cast concrete, four inches square and three feet long, set flush with the finished grade. Three-fourths-inch to one-inch steel pipes or gun barrels three feet long may be used at lot corners. Where street monuments and lot corners occupy the same point, stone or concrete monuments shall be used.

§ 159-34. Street acceptance.

Upon completion of any subdivision or any street therein and prior to the final release of a bond or covenant, the developer shall submit to the Board a final plan of each street layout, including lot frontage, bounds and pins which have been set and ties to intersecting street layouts. This plan shall be used as a street acceptance plan and shall be drawn in accordance with standards set by the Town Engineer. The plan shall be prepared by a registered professional land surveyor and shall be suitable for recording in the Hampden County Registry of Deeds. Accompanying this plan, the developer shall supply the Board with a document releasing the Town from any damages which he may incur by the acceptance of the street by the Town.

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12. **Editor's Note: Former Subsection C, as amended 9-18-1997, which immediately followed and provided for a buffer strip, was repealed 10-28-2004.**

ARTICLE VI
Administration

§ 159-35. Waiver of regulations.

Strict compliance with the requirements of these rules and regulations may be waived when, in the judgment of the Board, such action is in the public interest and not inconsistent with the Subdivision Control Law.[13]

§ 159-36. Matters not covered by regulations.

For matters not covered by these rules and regulations, reference is made to MGL c. 41, § 81-K to 81-GG, inclusive, and the Federal Environmental Protection Act and the Massachusetts Protection Act.

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13. Editor's Note: See MGL c. 41, § 81K through 81GG, inclusive.

ARTICLE VII
Floodplains

Commented [CM41]: See updates as presented at 5/14/21 Working Group Meeting.

§ 159-37. Rules and regulations.

The Planning Board herewith stipulates rules and regulations for the subdivision and/or development of land which lies within the floodplain as described in the Town Ordinance.[14]

§ 159-38. Authority; priority of regulations.

Authority for these regulations is derived from the commitment of the Town of Agawam to the Federal Insurance Administrator under the Federal Flood Insurance Act. These rules and regulations shall take priority over any conflicting regulations of the Planning Board.

A. The finished grade of land at all sides of any major building shall be set at a minimum grade above flood level as determined by the Planning Board from historic flood data.

B. The total area may not be removed from the floodplain or graded in such a way as to cause additional hazard to the remainder of the floodplain areas. No more than one-third (1/3) of the total area may be regraded or filled.

C. More than one exit from the total area shall be provided for emergency evacuations by clearing and suitable grading and related work, and no obstructions to vehicular passage shall be allowed within the exit route. This exit may not require paving or other surfacing. The developer shall so note any deeds concerning obstructions to passage.

D. Utilities. Town sewer systems shall be constructed to the specifications of the Department of Public Works and Board of Health to ensure safety from flooding. All water lines, gas and electric lines shall be constructed with suitable area master shutoff valves. All aboveground utility control boxes shall be constructed to avoid flood damage and to elevations as determined by the Planning Board. Electric and telephone lines shall be underground and all access to underground utilities shall be constructed to the specifications of the Department of Public Works. Any drainage pipes opening into the floodway (river or stream) shall be constructed to the specifications of the Department of Public Works to prevent flooding of the system.

E. All plans reviewed by this Board which lie in the floodplain shall be stamped or legally noted so that landowners and future occupants shall be aware of their responsibilities. The notation shall be endorsed on Form A, Subdivision Control Not Required, as well as Form B, Subdivision Control, preliminary and definitive plans.[15]

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14. Editor's Note: See Art. XII of Ch. 180, Zoning.

15. Editor's Note: Forms A and B are on file in the Planning Department offices.

159 Attachment 1

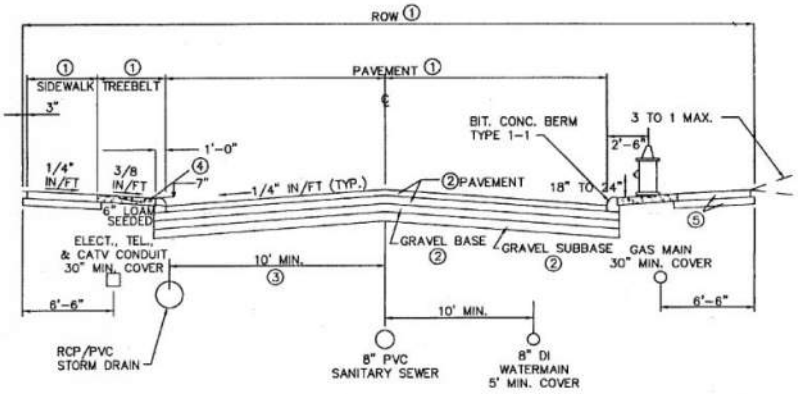
Table 4.1
Town of Agawam
Street Design Standards
[Amended 12-5-1996]

Average Daily Traffic (number of vehicles)	Type of Street	Right-of-Way Width (feet)	Pavement Width (feet)	Minimum Radius of Curvature (feet)	Maximum Grade[1] (percent)	Sidewalk Width (feet)	Tree Belt Width (feet)	Minimum Length Vertical Curve	Design Speed (mph)	Stopping Distance (feet)
0-100	Place	46	26	150	10	5	5	Based on safe stopping, sight distances and satisfactory curb drainage	20	110
101-400	Lane	50	30	225	8	5	5		25	150
401-1000	Subcollector	60	36	300	6	5	7		30	200
1001-3000	Collector	66	40	400	5	5	8		35	250
3001+	Arterial	To be determined by Planning Board on an individual basis								

NOTE:
[1] Minimum grades on all streets shall be 1.0% except where such a minimum will adversely affect ride, as determined by the Town Engineer, in which case the minimum grade will be 0.5%.

159 Attachment 2

Figure 4.2
Town of Agawam
Typical Road Section
September 25, 1996



DPW Sept 25, 1996

NOTES:
(1) Width variable, see Table 4.1 for street design standards.
(2) See Table 5.1 for roadway structure design.
(3) Distance = 8'0" for Place.
(4) See standard drives detail.
(5) 5'0" wide cement concrete sidewalk – see Subdivision Regulations for detail.

Page 12: [1] Deleted Corrin Meise-Munns 3/18/2021 11:49:00 AM

LOW IMPACT DEVELOPMENT REVIEW CHECKLIST - Zoning **NDPES MS4 Community: Town of Agawam**		Created and executed by Pioneer Valley Planning Commission, SFY 2021
This checklist was developed using The Center for Watershed Protection's Code and Ordinance Worksheet; U.S. Environmental Protection Agency's Water Quality Scorecard (2009); the Metropolitan Area Planning Council's Low Impact Development Toolkit Checklist for Regulatory Review; and EPA's April 2011 Checklist entitled, "Assessing Street and Parking Design Standards to Reduce Excessive Impervious Cover..."		
Y/N	**Checklist Item**	**Notes (include location in code and any standards)**
Assess Street Design and Parking Lot Guidelines (NPDES Draft permit 2.3.6)		
	Are parking maximums used in any instances (to prevent too much parking)?	
	Does town require more than 3 off street parking spaces per 1,000 sq. ft. of gross floor area for office uses?	Could not find?
N	Does town require more than 4.5 off street parking spaces per 1,000 sq. ft. of gross floor area for shopping centers?	4.5 spaces/1000 sq ft is minimum in Business B (180-48)
N	Does town vary parking requirement by zone to reflect places where more trips are on foot or by transit?	Does not appear to be so, but parking is not clearly dilineated in most districts
N	Does town have reduced off-street parking requirements for its downtown zoning district?	Does not appear to be so, but parking is not clearly dilineated in most districts
N	Does the town have lower parking requirements for properties near transit stops?	
N	Does the town allow reduced parking requirements for properties within walking distance to multiple services?	
N	Does the town have lower parking requirements for properties in the more densely developed residential districts?	Does not appear to be so, but parking is not clearly dilineated in most districts
N	Does town require more than 2 off-street parking spaces per residential unit?	A1 Districts (180-17) and A2 Districts (180-23) seem to not have parking reqs delineated; A3 District (180-29) require two off-street parking spaces per lot; A4 District (180-30) Requires one off-street space per lot. B Residence Districts do not specify parking spaces.
Y	Does town require 2 off-street parking spaces per residential unit?	
N	Does town require less than 2 off-street parking spaces per residential unit?	
N/A	Does town require more than 1 off-street parking space for an accessory dwelling unit?	
N	Does the town have lower parking requirements for smaller residential units?	
Y/N	Does the town have provisions allowing for shared parking to reduce parking requirements?	Shared parking scheme is perferred for retail shopping areas in Business B (180-48) and allowed in mixed-use
Y/N	Are the town's shared parking provisions by right?	Yes for Buisness B and Mixed Use, or at least not specified that it is not by right?
	Does the town provide model shared parking arrangments for private use?	

N	Does the town allow alternative measures such as custom parking demand calculations, transportation demand management or in-lieu payments to reduce required parking?	Business A District (180-47) allows for reduction in parking reqs by special permit by Board of Appeals, if permitted, the business must permanently maintain a landscaped open space to adequately accommodate the difference between req'd parking spaces and the parking spaces provided. In no event shall Board approve less than 30 parking spaces.
N	Does the town allow for common driveways?	
	If yes, are they allowed by right?	
Y & N	Is requirement for standard parking lot stall consistent with LID purposes? (LID Standard: 9 feet or less by 18 feet or less)	9x18 (Business B 180-48) MINIMUM
N/A	Is requirement for residential driveway width consistent with LID purposes? (LID Standard: 9 feet wide for one lane / 18 feet wide for two lanes)	Did not find any specifications
N	For larger commercial parking lots, are there provisions requiring compact car spaces?	
N	If yes, are at least 30% of parking spaces required to have smaller dimensions for compact cars?	
Y	Is there a minimum perncentage of a parking lot required to be landscaped?	Business B 180:48 reqs 15% of interior space to be landscaped, with standards of numbers of trees per length of parking rows
?	Do commercial landscaping requirements for parking areas allow for vegetated areas with bioretention functions?	Unspecified
N	Do commercial landscaping requirements for parking areas encourage vegetated areas with bioretention functions?	See suggestion in 180-48 I (2)(f)[2]
Y	Is the use of bioretenion islands and other stormwater practices within landscaped areas or setbacks allowed (versus requirement for curb and gutter)?	Business B districts 180:48 I (2)(e) Greenspace and buffers -- not clear if "buffers" equals "setbacks"
N	Is the use of bioretenion islands and other stormwater practices within landscaped areas or setbacks encouraged?	No preference stated
Y/N	Can porous surfacing materials be used for parking stalls, spillover parking areas, shoulders, etc.?	Only mentioned in performance standards for mixed-use developments, 180:126
Y/N	Is the use of porous surfacing materials for parking stalls, spillover parking areas, shoulders, etc encouraged?	In performance standards for mixed-use developments, 180:126
Development Policies in Zoning Regulations		
N/A	Are regulations that govern stormwater within the zoning code consistent with the Stormwater Management/LID ordinance/bylaw?	Suggest to reference out to avoid duplication and/or conflict. Suggested language to Site Plan Review -- not sure where else to add?
N	Do planning processes encourage an LID approach? (site plan approval)	See suggestions in 180-13 Site Plans to include mapping of natural resources
?	Are bioretention areas, rain gardens, filter strips, swales and constructed wetlands allowed in setback areas?	Business B district allows for setbacks to house stormwater facilities, but no mention of type of facility allowed
Y	Does language on screening and buffers indicate that these areas could be used for stormwater management?	Business B districts 180:48 I (2)(e) Greenspace and buffers -- not clear if "buffers" equals "setbacks"
Y	Are there any special districts or regulations that permit cluster development?	§ 180-112 Open Space Residential Development
Y	Is open space (cluster) development permitted by right?	Residence A-1, Residence A-2, and Agricultural Districts

N	Are the submittal or reeview requirements for open space / cluster developments greater than for conventional development?	
Y	Are there any flexible site design regulations that permit reductions in dimensional requirements to allow cluster development?	Did not find a Table of Dimensional/Density Standards for underlying zoning in A-1 and A-2 Districts. Agricultural seems to be 20,000 sqft per residence. OSRD lots are required to be 1 acre, which is quite large for cluster and is a 200% increase in underlying zoning req. for Agricultural district.
Y	Are there any regulations that permit reductions in dimensional requirements to increase flexibility in building placement?	Reduction in frontages on subdivision roads. Note: Reductions in frontages would allow for reduced road length/paved area, perhaps where appropriate such as in open space residential developments, at the outside sideline of curbed streets, and around cul de sacs
	What counts towards meeting open space requirements? (indicate all that apply)	
N	Stormwater management areas (e.g. bioretetention areas)	Not specified
Y	Wetland aras and water bodies	
N	Green roofs	Not specified
N	Can open space requirements be reduced if improved stormwater management facilities /open spaces are provided?	Not specified

Chapter 180

ZONING

GENERAL REFERENCES

Building construction — See Ch. 82.

Fees — See Ch. 103.

Fire prevention — See Ch. 106.

Subdivision of land — See Ch. 159.

Water and sewers — See Ch. 175.

ARTICLE I
General Provisions

§ 180-1. Purpose.

For the purpose of promoting the health, safety, convenience, morals and welfare of its inhabitants, the Town, under the authority granted by MGL c. 40A, §§ 1 to 22 inclusive, does hereby enact this chapter, to be hereafter known and designated as the "Zoning Ordinance" of the Town. Further purposes of this chapter are to lessen congestion in the streets, to secure safety from fire, panic and other danger, to provide adequate light and air, to prevent the overcrowding of land, to avoid undue concentration of population, to facilitate the adequate provision of transportation, water, sewerage, schools, parks and other public requirements and to increase the amenities of the Town.

§ 180-2. Definitions and word usage. [Amended 3-21-1994 by TOR-94-1; 2-20-2001 by TOR-2001-1; 5-20-2002 by TOR-2002-15; 2-6-2006 by TOR-2005-12; 11-5-2008 by TOR-2008-2; 11-7-2012 by TOR-2012-3]

A. For the purpose of this chapter, certain terms and words shall have the following meanings. Words used in the present tense include the future; the plural number includes the singular; the words "used" or "occupied" include the words "designed," "arranged," "intended" or "offered to be used or occupied"; the words "building," "structure," "lot," "land" or "premises" shall be construed as though followed by the words "or any portion thereof"; and the word "shall" is always mandatory and not merely directory.

B. Terms and words not defined herein but defined in the Building Code[1] or Subdivision Regulations[2] shall have the meanings given therein unless a contrary intention clearly appears. Words not defined in either place shall have the meanings given in the most recent edition of Webster's Unabridged Dictionary.

C. Definitions. For the purposes of this chapter, the following words and phrases shall have the meanings respectively ascribed to them by this section:

ABANDONMENT — The cessation of a nonconforming use or structure as indicated by the visible or otherwise indicated intention to discontinue a nonconforming use of a structure or a lot, or the cessation of a nonconforming use or structure by its replacement with a conforming use or structure.

ACCESSORY BUILDING — A subordinate building, located on the same lot as the main, or principal building or principal use, the use of which is customarily incidental to the main or principal use permitted in the district.

ACCESSORY USE — A use customarily incidental to that of the main or principal building or use of the land.

ADEQUATE CAPACITY — Capacity is considered to be adequate if the grade of service is p. 05 or better for a worst-case day in a preceding month, based on the Erllang B Tables, prior to the date of application; or as measured using direct traffic measurement of the personal wireless service facility in question for existing facilities requesting major modification and where the call blocking is due to frequency contention at the antenna(s).

1. **Editor's Note: See Ch. 82, Building Construction.**
2. **Editor's Note: See Ch. 159, Subdivision of Land.**

ADEQUATE COVERAGE — Coverage is considered to be adequate within that area surrounding a base station where the predicted or measured median field strength of the transmitted signal for at least 75% of the covered area is greater than -95 dbm. It is acceptable for there to be holes within the area of adequate coverage where the signal is less than -95 dbm, as long as the signal regains its strength to greater than -95 dbm further away from the base station. For the limited purpose of determining whether the use of a repeater is necessary or desirable, there shall be deemed not to be adequate coverage within said holes. The outer boundary of the area of adequate coverage, however, is that location past which the signal does not regain a strength of greater than -95 dbm.

ADULT DAY-CARE FACILITY — A building or structure where care, protection, and supervision are provided, on a regular schedule, to adults over the age of 18.

AGRICULTURE — The production, keeping or maintenance, for sale or lease, of plants and animals useful to man, including but not limited to: forages and sod crops; grains and seed crops; dairy animals and dairy products; poultry and poultry products; livestock, including beef cattle, swine, horses, mules, ponies, or goats or any mutations of hybrids thereof, including the breeding and grazing of any or all such animals, bees, and apiary products, for animals, trees and forest products; fruits of all kinds, including grapes, nuts and berries, vegetables, floral, nursery, ornamental and greenhouse products; or lands devoted to a soil conservation or forestry management program.

ALTERATION — Any construction, reconstruction or other action resulting in a change in the structural parts, height, number of stories, exits, size, use or location of a building or other structure.

AMUSEMENT PARK — A commercially operated park with a predominance of outdoor games and activities for entertainment, including shows or riding devices, games of skill or chance, or any combination of shows, riding devices, water slides, miniature golf, batting cages or any combination of several enterprises, such as revolving wheels, merry-go-rounds, giant swings, panoramas, musical and theatrical entertainments, or riding devices, whether carried on, engaged in or conducted as one enterprise or by several concessionaries, and whether an admission fee is charged for admission to all such shows for entertainment, or a separate fee for admission is charged for each amusement.

ANIMAL CLINIC OR HOSPITAL — A place where animals or pets are given medical or surgical treatment, and the boarding of animals is limited to short-term care incidental to the clinic or hospital use.

ANTENNA — A device which is attached to a tower or other structure for transmitting and receiving electromagnetic waves.

APARTMENT HOUSE — A building or structure arranged, intended and designed to be occupied by two to eight families, living independently of each other, and each including its own separate kitchen and bathroom accommodations. Garden-type apartments shall be considered as an apartment house.

ATTIC — The unfinished space between the ceiling of the top story of a building and its roof which is not used for living, sleeping or eating quarters.

BASE STATION — The primary sending and receiving site in a wireless telecommunications network.

BUILDING — A structure enclosed within exterior walls or firewalls, built, erected and framed of a combination of any materials, whether portable or fixed, having a roof, to form

a structure for the shelter of persons, animals or property. For the purpose of this definition, "roof" shall include an awning or any similar covering, whether or not permanent in nature. The word "building" shall be construed, where the context requires, as though followed by words "or part or parts thereof." A porch or an attached garage, greenhouse or similar structure is to be considered as part of a building when considering the requirements of setback, side or rear yards.

BUSINESS — The transacting or carrying on of a trade or commercial enterprise with a view to profit or for livelihood.

CEMETERY — Land used or intended to be used for the burial of the dead and dedicated for cemetery purposes, including columbariums, crematoriums, mausoleums, and funeral establishments, when operated in conjunction with and within the boundary of such cemetery under the care and supervision of the Town or other public authority.

CHANNEL — The segment of the radiation spectrum from an antenna which carries one signal. An antenna may radiate on many channels simultaneously.

CHILD-CARE FACILITY — Facilities that serve children under seven years of age, or 16 years if the children have special needs, or school-age children (under 14 years of age or 16 years if they have special needs), in programs that are held before or after school hours or during vacations. A child-care facility defined in MGL c. 28A, § 9.

CLUB OR LODGE, PRIVATE — Buildings, structures and premises used by a nonprofit social or civic organization or by a nonprofit organization, catering exclusively to members and their guests for social, civic, recreation, or athletic purposes which are not conducted primarily for gain and provided there are no vending stands, merchandising, or commercial activities except as may be required generally for the membership and purposes of such organization.

COMMERCIAL RECREATION, INDOORS — A structure for recreational, social or amusement purposes, which may include as an accessory use the consumption of food and drink, including all connected rooms or space with a common means of egress and entrance. Places of assembly shall include theaters, concert halls, dance halls, skating rinks, bowling alleys, health clubs, dance studios, or other commercial recreational centers conducted for or not for profit.

COMMERCIAL RECREATION, OUTDOORS — Driving range, bathing beach, sports club, horseback-riding stable, boathouse, marina or other commercial recreation carried on, in whole or in part, outdoors, except those activities more specifically designated in this chapter.

COMMUNICATION EQUIPMENT SHELTER — A structure located at a base station designed principally to enclose equipment used in connection with personal wireless service transmissions.

CONVENIENCE STORE — A retail store that sells groceries and may also sell gasoline; does not include automotive service stations or vehicle repair shops.

CREMATORY — A building containing a furnace designed and intended to be used for cremating the dead and owned and controlled by a cemetery corporation or crematory corporation duly organized under the laws of the state.

DBM — Unit of measure of the power level of an electromagnetic signal expressed in decibels referenced to one milliwatt.

DETACHED — Separate from.

DWELLING — A building designed and occupied as the living quarters of one or more families. Single- and two-family dwellings shall be designed for and occupied by not more than one or two families, respectively. A multifamily dwelling shall be one designed for and occupied by two or more families. Hotels, lodging houses, hospitals, membership clubs, or dormitories shall not be considered dwellings.

EARTH REMOVAL — Extraction of sand, gravel, topsoil, or other earth for sale or for use at a site removed from the place of extraction, exclusive of the grading of a lot preparatory to the construction of a building for which a building permit has been issued or the grading of streets in accordance with an approved definitive plan, and exclusive of granite operations.

EDUCATIONAL USE — Use of land or structures for education purposes on land owned or leased by the commonwealth or any of its agencies, subdivisions or bodies politic or by a religious sect or denomination or by a nonprofit education corporation. Educational facilities not exempted from regulation by MGL c. 40A, § 3.

EMF — Electromagnetic frequency radiation.

ERECT — To build, construct, reconstruct, move upon, or conduct any physical development of the premises required for a building; to excavate, fill, drain, and the like preparation for building shall also be considered to erect.

ESSENTIAL SERVICES — Services provided by a public service corporation or by governmental agencies through erection, construction, alteration, or maintenance of gas, electrical, steam, or water transmission or distribution systems and collection, communication, supply, or disposal systems, whether underground or overhead, but not including wireless communications facilities. Facilities necessary for the provision of essential services include poles, wires, drains, sewers, pipes, conduits, cables, fire alarm boxes, police call boxes, traffic signals, hydrants and other similar equipment in connection therewith.

FACILITY SITE — The location within a Wireless Telecommunications Overlay District leased by one or more personal wireless service providers and upon which one or more personal wireless service facility(ies) and required landscaping are located.

FAMILY — A number of individuals related by blood, marriage and/or adoption or a group of unrelated individuals, not to exceed four, who are occupying a dwelling unit and living as a single nonprofit housekeeping unit. This definition, however, does not apply to nonrelated disabled persons as defined by any applicable federal and/or state law and/or regulations.

FAMILY DAY-CARE FACILITY — Any private residence which on a regular basis receives for temporary custody and care, during part or all of the day, children under seven years of age or children under 16 years of age if such children have special needs; provided, however, in either case, that the total number of children shall not exceed more than six, excluding participating children living in the residence.

FARMSTAND — A facility for the sale of produce, and wine and dairy products, provided that during the months of June, July, August, and September of every year, or during the harvest season of the primary crop raised on land of the owner or lessee, the majority of such products for sale, based on either gross sales dollars or volume, have been produced

by the owner or lessee of land containing more than five acres on which the facility is located, used primarily for agriculture in conformance with MGL c. 40A, § 3.

FCC — Federal Communications Commission. The government agency responsible for regulating telecommunications in the United States.

FCC 96-326 — A report and order which sets new national standards for emissions of radio frequency emissions from FCC-regulated transmitters.

FENCE — An artificially constructed barrier of any material or combination of materials erected to enclose or screen areas of land.

FLOOD or FLOODING — A general and temporary condition of partial or complete inundation of normally dry land areas from:

(1) The overflow of inland or tidal waters;

(2) The unusual and rapid accumulation or runoff of surface waters from any source.

FLOODWAY — The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot.

FLOODWAY FRINGE — The land in the floodplain within a community subject to a one-percent-or-greater chance of flooding in a given year that is located outside of the floodway.

GARAGE, PRIVATE — A building or space used as an accessory to or a part of a main building permitted in any residential district, and providing for the storage of one or more motor vehicles and in which no business, occupation or service for profit is in any way conducted.

GARAGE, PUBLIC — A garage, other than a private or storage garage, which is used for the short-term parking of vehicles.

GARAGE, REPAIR — A building or portion thereof, other than a private or storage garage, designed or used for equipping, servicing, repairing, hiring, selling, and/or storing of motor vehicles. The term "repairing" shall not include an automobile body repair shop nor the rebuilding, dismantling, or storage of wrecked or junked vehicles.

GASOLINE SERVICE STATION — A gasoline service station shall include any business selling or offering for sale any motor fuel, such as gasoline or diesel fuel, to the public, whether or not the public is permitted or expected to operate the pump to put the fuel into a motor vehicle's fuel tank or a container, and shall include gasoline filling stations and gasoline self-service stations. For the purposes of this chapter, "gasoline service station" shall also include any site used or operated as a retail refueling site, including the fuels of gasoline, propane, electricity and hydrogen.

GHZ — Gigahertz: one billion hertz.

GRADE OF SERVICE — A measure of the percentage of calls which are able to connect to the base station during the busiest hour of the day. Grade of service is expressed as a number, such as p. 05, which means that 95% of callers will connect on their first try. A lower number (p. 04) indicates a better grade of service.

HALF STORY — The space between the ceiling of the top story of a building and the roof where the area and height are sufficient for sleeping and living quarters.

HAZARDOUS MATERIAL — Any substance which is listed in, but not limited to, the EPA priority pollutants as described in Section 307(a) of the Clean Water Act, as amended.

HEIGHT — The vertical distance from the average finished grade of the adjacent ground to the top of the structure of the highest roof beams of a flat roof, or the mean level of the highest gable or slope of a hip roof.

HERTZ — One hertz is the frequency of an electric or magnetic field which reverses polarity once each second or one cycle per second.

HOME OCCUPATION — An occupation, business, trade, service or profession which is incidental to and conducted in a dwelling unit or in a building or other accessory structure thereto, by a resident thereof.

HOSPITAL — An institution providing primary health services and medical or surgical care to persons, primarily inpatients, suffering from illness, disease, injury, deformity and other abnormal physical or mental conditions, and including, as an integral part of the institution related facilities such as laboratories, outpatient facilities or training facilities, a sanitarium, and clinic. The term "hospital" does not include a rest home, nursing home and/or convalescent home.

HOUSEKEEPING UNIT — See definition of "family."

JUNK VEHICLE — A wrecked, damaged, destroyed, nonoperational, abandoned or disassembled trailer, house trailer, boat, tractor, automobile, aircraft, or other motor vehicle, or any parts thereof. A junk vehicle includes apparently inoperable, immobile, disassembled or extensively damaged vehicles. Evidence of nonoperation and damage includes, but is not limited to, a buildup of debris that obstructs use, a broken window or windshield, a missing wheel, a flat tire, a nonfunctional motor or transmission, missing bumpers, or missing plates and the like.

KENNEL, COMMERCIAL — An establishment licensed to operate a facility housing dogs, cats, or other household pets and where grooming, breeding, boarding, training or selling of animals is conducted as a business.

KENNEL, PRIVATE — Any building or land designated or arranged for the care of dogs, cats or other household pets belonging to the owner of the residential, principal use, kept for purposes of show, hunting, or as pets.

LODGING HOUSE — A building containing more than five lodging units for semipermanent residence (longer than one week) for compensation and which meals may also be supplied as part of the fee. This shall not include bed-and-breakfast home uses, congregate housing, motels, hotels, multifamily dwellings, or nursing homes.

LIGHT MANUFACTURING — Fabrication, assembly, processing, finishing work or packaging.

LOADING SPACE, OFF-STREET — Space located on the same lot with a principal building, or contiguous to a group of buildings, for bulk pickups and deliveries, scaled to delivery vehicles expected to be used, and accessible to such vehicles when required off-street parking spaces are filled. It shall abut a street, alley, or other appropriate means of ingress or egress.

LOT — A continuous parcel of land with legally definable boundaries.

LOT, AREA — The horizontal area of the lot exclusive of any area in a street or recorded way open to public use.

LOT, CORNER — A lot located at the intersection of two or more streets.

LOT, DEPTH OF — The mean distance from the street line of the lot to its opposite rear line measured in the general direction of the side lines of the lot.

LOT, FRONTAGE OF — A lot line coinciding with the sideline of a street which provides legal rights of vehicular access and actual physical vehicular access to the lot. Frontage shall be measured continuously along a street and shall be the horizontal distance between the side lot lines measured at the point where the side lot lines intersect with the front setback line. Lots adjacent to paper streets may not use any portion of the paper street in calculating frontage or lot area.

LOT LINE — A line dividing one lot from another, or from a street or any public place.

LOT LINE, REAR — The lot line opposite the street line, except that, in the case of a corner lot, the rear lot line shall be the line opposite the street line on which the building is numbered or would be numbered.

MAJOR MODIFICATION OF AN EXISTING FACILITY — Any change or proposed change in power input or output, number of antennas, change in antenna type or model, repositioning of antenna(s), change in number of channels per antenna above the maximum number approved under an existing special permit. Also any increase or proposed increase in dimensions of an existing and permitted tower or other structure designed to support personal wireless service transmissions, receiving and/or relaying antennas and/or equipment.

MEDICAL CENTER OR CLINIC — A building designed and used for the diagnosis and treatment of human patients that does not include overnight care facilities.

MHZ — Megahertz: one million hertz.

MILE — A mile (5,280 feet) is to be measured from a point on an imaginary line which is perpendicular to the vertical line at that point.

MONITORING — The measurement, by the use of instruments in the field, of the radiation from a site as a whole or from individual personal wireless service facilities, towers or antennas.

MONITORING PROTOCOL — The testing protocol, initially the Cobbs Protocol, which is to be used to monitor the emissions from existing and new personal wireless service facilities and towers upon adoption of this chapter. The SPGA may, as the technology changes, require, by written regulation, the use of other testing protocols. A copy of the monitoring protocol shall be on file with the Town Clerk.

MONOPOLE — A single self-supporting vertical pole with below-grade foundations.

MOUNT — The structure or surface upon which antennas are mounted, including the following four types of mounts:

(1) Roof-mounted: mounted on the roof of a building.

(2) Side-mounted: mounted on the side of a building.

(3) Ground-mounted: mounted on the ground.

(4) Structure-mounted: mounted on a structure other than a building.

MOTEL — A building or buildings intended and designed for transient overnight or extended occupancy, divided into separate units within the same building, with or without a public dining facility.

MOTOR VEHICLE COMMERCIAL — Any vehicle used or designed to be used for business or commercial purposes that infringes on the residential character of residential districts and includes, but is not necessarily limited to, a bus, cement truck, commercial tree-trimming equipment, construction equipment, dump truck, garbage truck, panel truck, semitractor, semitrailer, stake bed truck, step van, tank truck, tar truck, fire truck, or the like, or other commercial-type vehicle licensed by the state as a commercial vehicle or truck.

MOTOR VEHICLE GENERAL OR BODY REPAIR — An establishment, garage or work area enclosed within a building where repairs are made or caused to be made to motor vehicles and their bodies, including fenders, bumpers and similar components of motor vehicle bodies, but does not include the storage of vehicles for the cannibalization of parts or fuel sales.

MUNICIPAL FACILITIES — Facilities owned or operated by the Town of Agawam.

NONCONFORMING BUILDING OR STRUCTURE — A building or structure, existing at the effective date of this chapter, or any subsequent amendment thereto, which does not conform to one or more provisions of this chapter.

NONCONFORMING LOT — A lot lawfully existing at the effective date of this chapter, or any subsequent amendment thereto, which is not in accordance with all the provisions of this chapter.

NONCONFORMING USE — A use lawfully existing at the time of adoption of this chapter, or any subsequent amendment thereto, which does not conform to one or more provisions of this chapter.

NURSING, REST HOME OR CONVALESCENT HOME — An extended or intermediate care facility licensed or approved to provide full-time convalescent or chronic care to individuals who, by reason of advanced age, chronic illness or infirmity, are unable to care for themselves.

OFF-SITE MEDICAL MARIJUANA DISPENSARY (OMMD) — A registered marijuana dispensary that is located off site from the cultivation/processing facility (and controlled and operated by the same registered and approved not-for-profit entity which operates an affiliated RMD) but which serves only to dispense the processed marijuana, related supplies and educational materials to registered qualifying patients or their personal caregivers in accordance with the provisions of 105 CMR 725.00.**[Added 5-5-2014 by TOR-2014-1]**

OFF-STREET PARKING SPACE — A space of 200 square feet or more plus access and maneuvering space, whether inside or outside a structure, for exclusive use as a parking stall for one motor vehicle, and further being surfaced with durable pavement.

OPEN SPACE — The space on a lot unoccupied by buildings, structures, driveways, off-street parking or loading spaces or other impervious surfaces.

ORDINARY HIGH-WATER MARK — The highest point on the bank of a floodway or floodplain at which the water level has been for a sufficient period of time to leave a definite mark.

PERSONAL WIRELESS SERVICES — Commercial mobile services, unlicensed wireless services and common carrier wireless exchange access services. These services include cellular services, personal communications services (PCS), specialized mobile radio services and paging services.

PERSONAL WIRELESS SERVICE FACILITY — All equipment (excluding any repeaters) with which a personal wireless service provider broadcasts and receives the radio frequency waves which carry their services and all locations of said equipment or any part thereof. This facility may be sited on one or more towers or structures(s) owned and permitted by another owner or entity.

PERSONAL WIRELESS SERVICE PROVIDER — An entity licensed by the FCC to provide personal wireless services to individuals or institutions.

PRINCIPAL BUILDING — A building in which is conducted the principal use of the lot on which it is located.

PRINCIPAL USE — The main or primary purpose for which a structure or lot is designed, arranged or intended, or for which it may be used, occupied or maintained under this chapter. Any other use within the main structure or the use of any other structure or land on the same lot and incidental or supplementary to the principal use and permitted under this chapter shall be considered an accessory use.

RADIATION PROPAGATION STUDIES OR RADIAL PLOTS — Computer-generated estimates of the radiation emanating from antennas or repeaters sited on a specific tower or structure. The height above mean sea level, power input and output, frequency output, type of antenna, antenna gain, topography of the site and its surroundings are all taken into account to create these simulations. They are the primary tool for determining whether a site will provide adequate coverage for the personal wireless service facility proposed for that site.

REAR YARD — The required unoccupied space or area within the rear lot line and the part of the principal building nearest such rear lot line.

REGISTERED MARIJUANA DISPENSARY (RMD) — A use operated by a not-for-profit entity registered and approved by the Massachusetts Department of Public Health in accordance with 105 CMR 725.000, and pursuant to all other applicable state laws and regulations, also to be known as a "medical marijuana treatment center," that acquires, cultivates, possesses, processes (including development of related products such as food, tinctures, aerosols, oils, or ointments), transfers, transports, sells, distributes, dispenses, or administers marijuana, products containing marijuana, related supplies, or educational materials to registered qualifying patients or their personal caregivers. An RMD shall explicitly include facilities which cultivate and process medical marijuana and which may also dispense and deliver medical marijuana and related products. The cultivation and processing of medical marijuana in accordance with these regulations is considered to be a manufacturing use and is not agriculturally exempt from zoning.**[Added 5-5-2014 by TOR-2014-1]**

RESTAURANT — A building, or portion thereof, which is designed, intended and used for the indoor sales and consumption of food prepared on the premises, except that food

may be consumed outdoors in landscaped terraces, designed for dining purposes, which are adjuncts to the main indoor restaurant facility. The term "restaurant" shall not include "fast-food establishments."

RESTAURANT, FAST-FOOD — An establishment engaged primarily in the business of preparing food and purveying it on a self-service or semi-self-service basis. Customer orders and/or service may be by means of a walk-up counter or window designed to accommodate automobile traffic. Consumption is either on or off the premises.

RESTAURANT, DRIVE-IN AND DRIVE-THROUGH — A restaurant which provides convenient vehicular access and may provide service to customers while in their vehicles.

SANITARIUM — A hospital used for treating chronic and usually long-term illness.

SEMIDETACHED DWELLING — A single-family residential unit that is joined on one side to another single-family residential unit having a party wall between the units.

SERVICES, PROFESSIONAL — Establishments primarily engaged in rendering services by professional persons on a fee or contract basis, including, but not limited to, the following: accounting, auditing, and bookkeeping; medical, dental or health; planning, engineering and architectural; education and science; attorneys and notary publics; etc.

SETBACK — The minimum required unoccupied space or area between the street line of which the building is numbered or would be numbered and the part of the building nearest such street line, such unoccupied space or area extending the entire width or distance across the lot.

SIDE LOT LINE — The line dividing one lot from another.

SIDE YARD — The required unoccupied space and area within the lot between the side lot line and parts of the building nearest such side lot line. In the case of a corner lot, one of the side yards shall be the unoccupied space or area between the street line of the side street and the parts of the building nearest to such street line.

SIGN — Any device, surface or framework on which words, symbols or other designs are inscribed or displayed and designed to call attention thereto, including flags, banners and the like.

SIGN, ACCESSORY — Any sign that advertises or indicates the person occupying the premises on which the sign is erected or maintained or the business transacted thereon or the products sold thereon.

SIGN, AREA OF —

(1) Area of the face. The area of the face of a sign shall be considered to include all lettering, working and accompanying designs and symbols, together with the background on which they are displayed and any cutouts or extensions.

(2) The area of a sign consisting of individual letters or symbols attached to or painted on a surface, building, wall or window shall be considered to be that of the smallest quadrangle or triangle which encompasses all the letters and symbols.

(3) The area of a sign consisting of a three-dimensional object shall be considered to be the area of the largest vertical cross section of that object.

(4) In computing the area of the signs, both sides of V-shaped signs, but only one side of the back-to-back signs, shall be counted.

SIGN, BILLBOARD — Any nonaccessory sign greater in face area than 40 square feet.

SIGN, COLOR — The color concept of the sign shall be such that it does not violate the purpose of this chapter.

SIGN, INSTRUCTIONAL — Signs indicating "entrance," "exit" or the like, erected on premises for the direction of persons or vehicles.

SIGN, OUTDOOR ADVERTISING BOARD — The Outdoor Advertising Board of the Commonwealth or any board or official which may hereafter succeed to its powers or functions.

SIGN, OVERHANGING — A sign or other advertising device which hangs or extends over a sidewalk or a way in which the public has a right of access. Wall signs and standing signs shall not be included in this definition.

SIGN, REAL ESTATE — A sign advertising the sale, rental or lease of the premises on which it is maintained.

SIGN, STANDING — A sign standing or hanging free on its own support; such support may be attached to a building or fixed in or to the ground. Standing signs may have two faces or sides showing in opposite directions.

SIGN, STRUCTURE — The supports, uprights, bracing and framework of a sign. Any color applied to the "structure" shall meet the purposes of this chapter.

SIGN, TEMPORARY — Any sign, including its supporting structure, intended to be maintained for a period less than 180 days for agricultural purposes and 60 days for any other purposes.

SIGN, WALL — A sign fastened or affixed parallel to and within 12 inches of the wall of a building.

SIGN, WINDOW — A sign painted or placed on the inside or outside of a window.

SINGLE-FAMILY DWELLING — A structure designed exclusively for and occupied exclusively by one family.

SITE PLAN — A plan, to scale, showing uses and structures proposed for a parcel of land as required by the zoning regulations, including lot lines, streets, building sites, buildings, landscape features, traffic circulation, parking, drainage, utilities, signs, topography and lighting within the parcel.

SPECIAL PERMIT GRANTING AUTHORITY — The Board of Appeals of the Town of Agawam.

STORAGE CAPACITY OF A FLOODPLAIN — The volume of space above an area of floodplain that can be occupied by floodwater of a given stage at a given time, regardless of whether the water is moving.

STORY — The horizontal portion through a building between floor and ceiling. The word "story" shall not include the portion of the basement or cellar of a building above grade or an attic as defined in this section.

STREET — An accepted Town way, or a way established by or maintained under county, state, or federal authority, or a way established by a subdivision plan approved in accordance with the Subdivision Control Law,[3] actually constructed to specifications or for which adequate security exists to construct such a way.

STREET LINE — The dividing line between a street and a lot and, in the case of a public way, the street line established by the public authority laying out such way upon which the lot abuts.

STREET, PAPER — A street shown on a recorded plan but never built on the ground.

STREET RIGHT-OF-WAY — A general term denoting land, property or interest therein, usually a strip acquired for or devoted to a planned roadway. A street right-of-way should be sufficient to accommodate the ultimate roadway, including, but not limited to, the street pavement, shoulder, grass strip, sidewalk, public utility facilities, street trees, and snow storage.

STRUCTURE — A combination of materials assembled at a fixed location to give support or shelter, such as a building, framework, retaining wall, tent, reviewing stand, platform, bin fence, sign, flagpole, recreational tramway, and mast for radio antenna or the like. The word "structure" shall be construed, where the context allows, as though followed by the words "or part or parts thereof."

SUBSTANTIAL IMPROVEMENT IN THE FLOODPLAIN — Any repair, reconstruction or improvement of a structure, the cost of which equals or exceeds 50% of the assessed value of the structure either before the improvement is started or, if the structure has been damaged and is being restored, before the damage occurred. Substantial improvement is started when the first alteration of any structural part of the building commences.

TOWER — A monopole that is designed to support personal wireless service transmission, receiving and/or relaying antennas and/or equipment.

TRAILER — Any so-called automobile trailer, mobile home or trailer coach, including any portable structure, means of conveyance or vehicle so designed or constructed, altered or converted in any manner as to permit occupancy thereof for dwelling or sleeping purposes.

TRUCKING TERMINAL — Terminal facilities for handling freight, with or without maintenance facilities.

UNREGISTERED MOTOR VEHICLES — Any motor vehicle or trailer not registered in accordance with Massachusetts General Laws Chapter 90, or any motor vehicle which fails to carry or display its license plate as provided in § 6 of said Chapter 90; or any motor vehicle or trailer owned by a nonresident who has failed to comply with the registration laws of the nonresident state or country.

USE, SUBSTANTIALLY DIFFERENT — A use which by reason of its normal operation would cause readily observable differences in patronage, service, sight, noise, employment or similar characteristics from the use to which it is being compared.

WIRELESS TELECOMMUNICATIONS OVERLAY DISTRICT (WTOD) — Specific area(s), determined by engineering analysis to contain sites where adequate service may be provided to the Town of Agawam, which, at the same time, have the potential of reducing or mitigating negative impacts in accordance with the overlay district as defined in this chapter.

YARD — A space open to the sky, located between a building or structure and a lot line, unoccupied except by fences, walls, poles, paving, and other customary yard accessories.

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3. Editor's Note: See MGL c. 41, § 81K et seq.

YARD, FRONT — A yard extending the full width of the lot and situated between the street line and nearest point of the building.

YARD, REAR — The required unoccupied space or area within the rear lot line and the part of the principal building nearest such rear lot line.

YARD, SIDE — The required unoccupied space or area within the lot between the side lot line and parts of the building nearest such side lot line. In the case of a corner lot, one of the side yards shall be the unoccupied space or area between the street line of the side street and the parts of the building nearest to such street line.

§ 180-3. Districts enumerated; Building Zone Map.

A. For the purpose of this chapter, the Town shall be divided into 13 classes of districts as follows: **[Amended 4-3-2006 by TR-2006-9; 8-12-2013 by TOR-2013-6; 6-2-2014 by TOR-2014-4]**

Residence A-1 Districts

Residence A-2 Districts

Residence A-3 Districts

Residence A-4 Districts

Residence A-5 Age-Restricted Housing District

Residence A-6 Low-Density Multifamily Community District

Residence B Districts

Agriculture Districts

Business A Districts

Business B Districts

Mixed-Use Business C District

Industrial District A

Industrial District B

B. The boundaries of each district area hereby established as shown on the building zone map entitled: "Town of Agawam, Building Zone Map" one inch equals 800 feet and dated effective 1960, revised September 7, 2006, which is hereby declared to be a part of this chapter. Such shall be hereinafter referred to as the "Building Zone Map."[4] **[Amended 5-21-2007 by TOR-2007-4]**

§ 180-4. Filing of plans.

Unless otherwise ordered by the Inspector of Buildings, all applications for building permits under the provisions of the Building Code[5] of the Town shall be accompanied by plans in duplicate. Such plans shall be drawn to scale, shall show the actual dimensions, radii and angles of the lot to be built upon, the exact size and location on the lot of the main building and accessory buildings to be erected and such other information as may be amended. One copy

4. **Editor's Note: The Building Zone Map is included as an attachment to this chapter..**

5. **Editor's Note: See Ch. 82, Building Construction.**

of the plans filed by the applicant shall be returned to him when approved by the Inspector of Buildings.

§ 180-5. Validity of existing building permits.

Any building permit issued prior to a notice of a hearing on the question of the enactment of this chapter shall be valid, provided that the construction work thereunder is commenced within six months after its issuance.

§ 180-6. Certificate of occupancy.

A. Hereafter no land shall be occupied or used and no building or structure which is erected or altered or in which the type of use is changed shall be occupied or used, in whole or in part, for any purpose until a certificate of occupancy is issued by the Inspector of Buildings stating that the building, structure or use complies with the provisions of this chapter. No such certificate shall be issued unless the building or structure and its uses, as well as the uses of all the premises, are in conformity with the provisions of this chapter.

B. A certificate of occupancy shall be required for any of the following:

(1) Any occupancy and use of a building hereinafter erected or altered.

(2) Any change in use of an existing building or structure or premises to a different use.

(3) Any change in use of a nonconforming use.

C. Upon completion or alteration of any building or structure and prior to the use of any such building, structure or premises, a certificate of occupancy shall be applied for on a form furnished by the Inspector of Buildings. Such application shall be acted upon within two days after the filing thereof.

§ 180-7. Nonconforming uses.

A. A nonconforming use and/or building is the lawful use of a structure or land, or lawful construction of a building at the time of the enactment of this chapter or of a prior ordinance applicable thereto, but which does not conform to the requirements after the adoption of this chapter or to this chapter as amended in the district in which it is located. **[Amended 3-7-2016 by TOR-2015-9]**

B. A building, structure, land or use which at the time of the enactment of this chapter is considered nonconforming: **[Amended 3-7-2016 by TOR-2015-9]**

(1) May be continued in that use except as provided in Subsection D of this section.

(2) Alteration and/or enlargement of existing nonconforming one- and two-family residential structures:

(a) The Zoning Administrator has the authority to issue permits, in writing, for alterations or enlargements thereto, if such alteration or enlargement, of and by itself, does not create any new nonconformities.

(b) In all other circumstances a permit must be applied for and granted by the ZBA.

(3) May be changed to a more restricted use, provided that, when so changed, it shall not be returned to the less restricted use.

(4) May be rebuilt or restored and again used as previously, in case of a building destroyed or damaged by fire, explosion or other casualty, provided that not more than 75% of the building or structure exclusive of foundations has been so damaged or destroyed, except that the Board of Appeals may order a permit issued in any case of such loss. Rebuilding or restoration, when permitted, shall be commenced within six months after such catastrophe or disaster and continuously carried to completion.

C. When a nonconforming use is discontinued as evidenced by lack of use or vacancy for a continuous period of 12 months or by the substitution of a more restricted use or of a conforming use, such nonconforming use shall not thereafter be reestablished, and all future uses shall be in conformity with the provisions of this chapter.

D. This section shall apply to any change of use and to any alteration of a building or structure when the same would amount to reconstruction, extension or structural change and to any alteration of a building or structure to provide for its use for a purpose or in a manner substantially different from the use to which it was put before alteration or for its use for the same purpose to a substantially greater extent.

§ 180-8. Supplementary regulations.

A. Cornices. Cornices may extend not more than three feet over into any required front, side or rear yards.

B. Fences or walls. Fence heights shall not exceed four feet on the setback portion of any lot perimeter and shall not exceed 6 1/2 feet in height on the remainder of the lot perimeter. On a lot which is adjacent to a higher zone classification, the fence heights shall conform to the higher classification. Notwithstanding the foregoing, fences may be erected by special permit to a height in excess of four feet, but not to exceed 6 1/2 feet, on the setback portion of any corner lot perimeter only. **[Amended 6-15-2009 by TOR-2008-6]**

C. Unsafe buildings. This chapter shall not be considered as preventing the strengthening or the restoration to a safe condition of any building or wall declared unsafe by the Inspector of Buildings.

D. Minimum open spaces. No lot shall be reduced in size or area so that any required yard, court or open space will be smaller than is prescribed by this chapter for the district in which it is located.

E. Location of automobile services. Public garages, automobile repair shops, greasing stations, storage battery service stations, gasoline filling stations or any of their appurtenances or accessory uses shall hereafter be erected or placed at least 25 feet from any residence or agricultural district, unless the spaces so used are entirely enclosed in masonry or concrete walls having fixed steel sash wire glass and having roofs without openings, except skylights with metal frames glazed with wire glass. Driveways and parking areas shall not have entrances or exits for motor vehicles within 100 feet, measured along the street line, of property on which there is a school, library, church, playground or institution for the sick, blind or feeble or for children under 16 years of age.

F. Vision clearance. On any corner lot vision clearance shall be provided in the following manner:

(1) On a corner lot in any Business A and Business B District the side line shall be a minimum of 10 feet from the side street and the parking of vehicles in this side area is prohibited.

(2) A triangular area free from obstruction shall be provided in which nothing shall be erected or maintained between a point 2 1/2 feet above the street grade and a point eight feet above the street grade and measuring at least 10 feet back from the point of intersection on each of such streets.

G. Removal of topsoil, sand and gravel.

(1) Unless otherwise provided in this section, there shall be no removal from the premises in any district of any sod, loam, clay, sand, gravel or quarried stone. ~~except as surplus material resulting from the construction of a building on the premises or the installation of a structure on the premises for which a permit has been issued.~~

(2) ~~The Board of Appeals may grant a permit in any district for the removal of sod or loam from any area, provided that no less than four inches of topsoil or loam remains, and provided further that the entire area disturbed is seeded with a suitable cover crop or is put to cultivation.~~

(3) The Board of Appeals, after public hearing, may permit the removal of sand, gravel or clay in any district under the following conditions:

(a) The applicant shall submit a plan showing existing grades in the area from which the above material is to be removed, together with finished grades at the conclusion of the operation.

(b) The plan shall provide for proper drainage of the area of the operation during and after completion, and no bank shall exceed a slope of one foot of vertical rise in 1 1/2 feet of horizontal distance except in ledge rock. No removal shall take place within 20 feet of a property line, except that, where the grade from a property line rises towards the lot where removal is to take place, material lying above the grade at the property line may be removed.

(c) At the conclusion of the operation or of any substantial portion thereof, the whole area where removal takes place shall be covered with not less than four inches of topsoil and seeded with a suitable cover crop, except where ledge rock is exposed.

(d) Before a permit is granted under this section, the applicant, if required by the Board of Appeals, shall post a bond with the Town Treasurer in an amount approved by the Board of Appeals as sufficient to guarantee conformity with the provisions of the permit issued hereunder.

H. Animal hospitals, kennels and runs. Kennel runs or accessory buildings and the raising of fur-bearing animals on land zoned as agricultural is allowed only after a hearing by the Board of Appeals. This land parcel must be five acres or more in area, with the following additional requirements:

Commented [P1]: Consider wording differently so that removal of topsoil in particular is prohibited. Removal of topsoil can significantly change the drainage characteristics and reduce infiltration capacity.

Language might go as follows:
Removal of topsoil is prohibited in all cases given the importance of topsoil for the management of stormwater.

(1) The setback shall be 500 feet from the street line.

(2) The side lot line shall be 200 feet.

(3) The rear yard setback shall be 200 feet.

I. Measurement of setbacks. To make provision for future fifty-foot roads, in the case of lots fronting on streets less than 50 feet in width, the required front yard setback shall be measured from a point 25 feet from the existing center of the roadway.

J. Swimming pools in residential districts. No swimming pool shall be constructed within any required front yard, nor within 10 feet from any side or rear lot line. Below-ground swimming pools having a depth of two feet shall be surrounded by a protective fence not less than four feet high. Any opening in such fence shall be protected by a gate equipped with a secure locking device.

K. Keeping of horses and ponies. Notwithstanding the permitted uses contained in the individual zoning district and sections of this chapter, the keeping of horses and ponies shall be permitted only in Agricultural, Residence A-2, Industrial A and B and Business A and B Districts, subject to the following requirements and regulations:

(1) Acreage. Three-fourths acre (32,670 square feet) shall be required for one horse or pony; 1/2 acre (21,780 square feet) shall be required for each additional equine. Foals under six months shall not be counted.

(2) Fences must be adequate to contain the animal within the property boundary.

(3) Barn location and setback requirements shall be as specified in the present Building Code[6] for outbuildings.[7]

L. Farm worker housing. Housing for farm workers located on land used for farming or agricultural purposes shall constitute an accessory use to farming in accordance with the Agawam Zoning Code § 180-37, and such housing is a permitted use as of right in an Agricultural District Zone and/or on parcels of land not in an agricultural zone exceeding five acres which are used for agricultural purposes. This regulation shall be applicable to all requests for site plan, building permit and all other approvals relating to farm worker housing, whether the request(s) involve the use, expansion, reconstruction of existing structures, and/or new construction of buildings or structures. **[Added 12-18-2006 by TOR-2006-10]**

§ 180-9. Repetitive petitions before Board of Appeals.

No appeal or petition under MGL c. 40A, § 15(3), as amended, for a variance from the terms of this chapter with respect to a particular plot of land and no application under MGL c. 40A, § 20 for a special exception to the terms of this chapter which has been unfavorably acted upon by the Board of Appeals shall be considered on its merits by such Board within two years after the date of such unfavorable action except with the consent of all the members of the Planning Board.

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6. Editor's Note: See Ch. 82, Building Construction.

7. Editor's Note: TOR-97-10, adopted 10-20-1997, added provisions for a moratorium on commercial wireless communications facilities to immediately follow this subsection. Said provisions were subsequently repealed 3-2-1998 by TOR-97-13. For current provisions on wireless communications facilities, see Article XIV, Personal Wireless Service Facilities and Towers.

§ 180-10. Repetitive petitions before Town Council.

No proposed ordinance or amendment making a change in this chapter which has been unfavorably acted upon by the Town Council shall be considered on its merits by the Town Council within two years after the date of such unfavorable action unless adoption of such proposed ordinance or amendment is recommended in the final report of the Planning Board as required by MGL c. 40A, § 6, as amended.

§ 180-11. Special use permit exceptions and special permits. [Amended 12-5-1988 by TOR-88-19; 1-19-1993 by TOR-92-17]

A. Authority and rules. The Board of Appeals by virtue of the authority vested in it by statute may, after public notice and hearing, in appropriate cases and subject to appropriate conditions and safeguards grant a special use permit exception to the terms of the Zoning Ordinance in harmony with the general purpose and intent of this chapter. The special permit granting authority may adopt and from time to time amend rules and regulations relative to the issuance of such permits and shall file a copy of said rules and regulations in the office of the Town Clerk.

B. Hearing, notice and decision.

(1) The special permit granting authority shall hold a public hearing within 65 days after the filing of an application with the special permit granting authority, a copy of which shall forthwith be given to the Town Clerk by the applicant.

(2) The special permit granting authority shall require notice be given by publication in a newspaper of general circulation in the Town once in each of two successive weeks, the first publication to be not less than 14 days before the hearing, and by posting such notice in a conspicuous place in the Town Hall. Notice shall be sent by mail, postage prepaid, to the petitioner, abutters and owners of land within 300 feet of the property line as they appear on the most recent applicable tax list, including those in another city or Town and the Planning Boards of all abutting cities and towns. Such notice shall be prepared, published, posted and mailed by the Board of Appeals.

(3) The special permit granting authority shall act within 90 days following the public hearing. Failure to take final action upon an application for a special permit within said 90 days shall be deemed a grant of the permit applied for.

(4) Upon granting of a special permit, a copy shall be issued to the owner and the applicant, if other than the owner of the property, certified by the special permit granting authority. No special permit shall take effect until a copy of the decision certified by the Town Clerk that 20 days have elapsed and no appeal has been filed, or if such appeal has been filed, that it has been dismissed or denied, is recorded in the Registry of Deeds wherein the land is located.

C. Duration. A special permit granted by the special permit granting authority shall lapse if a substantial use thereof has not commenced within two years, or in the case of construction, if construction has not begun within said two years. Exception may be made for good cause by the special permit granting authority.

D. Special consideration. Special permits shall be issued by the special permit granting authority for uses, whether or not on the same parcel as activities permitted as a matter of

right, which are necessary in connection with scientific research or scientific development or related production where the special permit granting authority finds that the proposed accessory use does not substantially derogate from the public good.

E. Planning Board report. The Planning Board shall transmit a report to the special permit granting authority on each special permit application. The Planning Board shall be notified at least 14 days prior to the public hearing on such a special permit. However, the special permit granting authority may act in the absence of a report from the Planning Board after this fourteen-day period.

F. Zoning Officer report. The Zoning Officer shall transmit a report to the special permit granting authority on each special permit application. The Zoning Officer shall be notified at least 14 days prior to the public hearing on such a special permit. However, the special permit granting authority may act in the absence of a report from the Zoning Officer after this fourteen-day period.

G. Standards for reviewing.

(1) The Board of Appeals shall not approve any such application for a special use permit unless it finds in its judgment all of the following conditions are met:

(a) The specific site is an appropriate location for such a use, building, structure or services.

(b) The use as developed will not adversely affect the health, safety or property value of the neighborhood.

(c) There will be no nuisance or potential hazard to vehicle or pedestrian safety.

(d) Adequate and appropriate facilities and controls will be provided for the proper and safe operation of the proposed use or service.

(2) The special use exception may be granted for a specific use that is not considered so objectionable or obnoxious that the proposed use would be against the public interest or detrimental or injurious to the character of the neighborhood.

H. Conditions attached to special permit approvals. In approving a special permit, the special permit granting authority may attach such conditions and safeguards as are deemed necessary to protect the neighborhood, such as, but not limited to, the following:

(1) Requirement of front, side or rear yards greater than the minimum required by this chapter.

(2) Requirement of screening of parking areas or other parts of the premises from adjoining premises or from the street by walls, fences, planting or other devices.

(3) Modification of the exterior features or appearance of the structure.

(4) Limitation of the size, number of occupants, method or time of operation or extent of facilities.

(5) Regulation of number, design and location of access drives or other traffic features.

I. Effect of denial. If the special permit granting authority after said hearing denies the use applied for, no further application for the same use will be entertained by the Board of Appeals for a period of two years from the date of said denial.

§ 180-12. Special permit for animal hospital.

A special permit may be granted for an animal hospital, but only in Business A and Business B Districts and with the additional requirements that animal hospitals shall be separate buildings in themselves and that no animals shall be kept out of the building in cages, runs, kennels or yards. A special permit may be granted subject to any other conditions and safeguards as are prescribed by the Board of Appeals.

§ 180-13. Site plans. [Added 5-7-1990 by TOR-90-26]

A. Site plans prepared and approved in accordance with this section shall be required to assist the Inspector of Buildings in the review of certain applications for building permits and to assure compliance with all applicable requirements of this chapter.

B. A site plan shall be required and shall be submitted in each of the following situations:

(1) Any proposed residential, business, industrial, institutional or other use of a new or renovated structure or of a parcel of land, or any change in any such use, structure or parcel, except for one-family detached dwellings and duplexes on separate lots.

(2) Any nonresidential use of a one-family dwelling.

(3) Any use requiring a special permit from the Board of Appeals. For this section, residences which are to be used solely for residential purposes are exempt. **[Amended 1-21-2003 by TOR-2002-8]**

(4) Any major change in any condition or feature which is not in conformance with any feature of a previously approved site plan. Changes to parking and/or curb cuts will always necessitate site plan review.

Applicants should be aware that land disturbance projects meeting the following thresholds are subject to the requirements of the Town of Agawam's Stormwater Management Ordinance and Regulations (Chapter 176, Article III of the General Ordinances):

- Administrative Review for Stormwater Management is required for new development or redevelopment projects that will create, individually or part of a common plan of development or sale, between 5,000 and up to but not including 43,560 square feet of disturbance.
- A Stormwater Management Permit is required for new development or redevelopment projects that will disturb 1 acre (43,560 square feet) or more of land or create 5,000 square feet or more of impervious cover. This includes construction activities for new development or redevelopment that disturb less than one acre if that disturbance is part of a larger common plan of development or sale that all together disturbs one or more acres.

For such projects, the Department of Public Works encourages applicants to attend at least one pre-application concept plan meeting. The meeting is intended to provide the applicant with advice and guidance relative to the approval process; and allow the applicant and Department of Public Works to have a preliminary conversation about the site, stormwater management and erosion control considerations, and concept plan. For this meeting, preparation of an existing resources /site analysis

map, a soils map, and a voluntary sketch plan are all recommended. This concept plan meeting with the Department of Public Works shall precede the site plan review procedure described hereunder.

C. Procedure.

(1) An applicant for site plan review under this section shall file with the Building Department 10 copies each of an application and a site plan. The site plan shall be prepared by an engineer, architect or landscape architect unless otherwise specified by the Planning Board.

(2) The Inspector of Buildings shall, within five days of receipt, transmit to the Planning Board 10 copies of the application and site plan.

(3) All site plans shall be prepared to scale on standard sheets of 24 inches by 36 inches to show with reasonable accuracy the following information, in addition to that required in § 180-4:

(a) A title block, containing the street address, applicant's name and address, date, scale and the name of the preparer of the plan.

(b) A site layout at a scale of no smaller than one inch equals 50 feet.

(c) Topography of the site and adjacent lands.

(d) Provision for the handling of vehicular traffic flow. All curb cuts must be clearly defined with widths and radii noted on the plan. Radii shall meet Town standards. Parking lot and site traffic flow must be clearly noted with signs or other methods if it is to be maintained as one-way.

(e) Parking areas and loading areas.

(f) Drainage. The plan must be submitted to the Department of Public Works for input prior to Planning Board review. No person may initiate a construction activity or land disturbance, including clearing, grubbing, land grading, earth moving, or other development or redevelopment activities that results in the disturbance of land in excess of the thresholds described in Article III, Chapter 176 of the General Ordinances without Administrative Review for Stormwater Management or approval or waiver of the requirement for a Stormwater Management Permit by the Town's Stormwater Authority. No work shall commence on the construction of an approved Site Plan until Administrative Review for Stormwater Management or a Stormwater Management Permit has been approved and issued. Wherever possible the proposed drainage system shall be designed to utilize, and be compatible with, the existing drainage patterns and existing natural features of the site.

(g) All public utilities (sewer, water, gas, electric).

(h) Landscaping. All landscaped areas are to be designated on the plan. These areas are to specify species type and size. The proposed landscape features and improvements shall be designed in conformance with landscaping requirements as specified in the appropriate zoning district.

(i) Sign location only.

(j) Exterior lighting.

(k) Rendering or elevations, including all mechanical facility support items originating from or terminating on the building exterior, or both.

(l) The location and characteristics of any proposed screening, fencing or other buffers.

(m) The location of any wetlands, streams, drainage swales and areas subject to flooding.

(n) The locations of existing significant natural resources, scenic areas, and historic site features, such as stands of trees, large trees (with a minimum diameter of 8" measured at 4.5' DBH [Diameter at Breast Height]), watercourses and wetlands, existing stone walls, fences, buildings, flood plains, and rock outcroppings.

Commented [CM2]: Agrees with SWM Ordinance and Subdivision R&R

(4) Within 21 days of receipt, the Planning Board shall hold a public meeting. The Planning Board shall within 35 days of receipt approve the site plan, approve it with modifications or return it for changes or additional information. When changes have been made or additional information provided, the above-specified time limits will apply. The Planning Board can in certain cases extend the review period if done so in writing and for good reason; however, the review period shall not exceed 90 days. A report containing the findings of the Board shall be submitted to the Inspector of Buildings for consideration in issuing a building permit.

(5) Any application for a building permit requiring site plan approval shall not be deemed complete until such site plan is submitted.

(6) Any decision pursuant to a site plan review shall be subject to the right of appeal to the Board of Appeals.

§ 180-14. Changes in Building Zone Map.

No zone as indicated on the Building Zone Map which is a part of this chapter shall be changed until after the Planning Board has held a public hearing thereon after due notice given and has submitted a final report with the recommendations to the Town.

§ 180-15. Enforcement.

The Inspector of Buildings shall enforce the provision of this chapter or any amendment thereof. He shall refuse to grant a permit for the construction, addition, alteration or change of use of any building, structure or premises if such proposed construction, addition, alteration or change of

use would be in violation of any of the provisions of this chapter, as amended. State and Town officers shall refuse any permit or license for a new use of a building, structure or land which would be in violation of this chapter or amendment thereof.

§ 180-16. Violations and penalties. [Amended 5-25-1989 by TOR-89-2]

Any person, partnership, trust, association or corporation violating any provision of this chapter, any condition under which any permit is issued or any decision rendered by the Board of Appeals shall be fined not more than $100 nor less than $25 for each offense. Each day that such violation exists shall constitute a separate offense under this section.

§ 180-16.1. Noncriminal proceedings for violations. [Added 11-21-2005 by TOR-2005-2]

A. Any violation of this Chapter 180 may, in the discretion of the Board of Appeals, be enforced by the Zoning Enforcement Officer, or the Inspector of Buildings, or their designee, by the noncriminal complaint method for which provision is made, and/or as set forth in MGL c. 40, § 21D, as amended from time to time, that is, non-criminal disposition. Fines issued pursuant to § 180-16.1 shall be as follows:

   (1) First offense: $25.

   (2) Second offense: $50.

   (3) Third offense and each subsequent offense: $100.

B. Each day on which a violation exists shall constitute and be deemed a separate offense.

ARTICLE II
Residence A-1 Districts

§ 180-17. Permitted uses.

In a Residence A-1 District as indicated by the Building Zone Map, no building or other structure shall be erected, altered or used and no land shall be used or occupied for any purpose except one or more of the following:

A. A one-family dwelling for one housekeeping unit only.

B. The office of a physician, surgeon, dentist or lawyer residing on the premises. No display, sign or other advertising device shall be permitted except an interior illuminated, reflective or nonilluminated professional nameplate having an area of not more than 144 square inches.

C. Town buildings, county, state and federal buildings, playgrounds and parks and such accessory buildings as may be ordered by the Board of Public Officers or Town officials having charge of the land upon which such accessory buildings are or will be erected.

D. Real estate signs having an area of not more than six square feet advertising the sale, rental or lease of the premises on which they are maintained.

E. Cemeteries adjacent to or in extension of existing cemeteries and crematories, provided that such crematories are situated within cemeteries.

F. Accessory uses customarily incident to any use or building permitted by this section, provided that such use of buildings shall not be offensive or dangerous to life by reason of health or fire, and provided further that such accessory use shall not include any activity conducted for gain. No advertising device, whether illuminated or otherwise, shall be permitted in connection with such accessory uses or building.

G. The keeping and raising of poultry, livestock and pigeons, whether raised for the table or other purposes, or other like objectionable uses are prohibited.

H. Private garages, provided that no business, service or industry is conducted therefrom or therein. Not more than one motor vehicle for each 5,000 square feet of lot area or fraction thereof up to a limit of five vehicles per lot shall be permitted. Space for motor vehicles shall not be used, leased or rented for commercial vehicles. No commercial vehicles shall be parked on a lot in the open. These space regulations shall apply to vehicles regularly left on the lot, whether housed or in the open. The presence of more than one unregistered vehicle is prohibited.[8]

§ 180-18. Height regulations.

A residence building shall not exceed 2 1/2 stories or more than 35 feet in height. Town buildings shall not exceed 50 feet in height. The height provisions shall not apply to chimneys or flag or radio poles. An accessory building shall not exceed 1 1/2 stories or 25 feet in height.

§ 180-19. Setback requirements.

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8. Editor's Note: See Ch. 172, Vehicles, Unregistered.

A. No part of any building shall be placed within 35 feet of any street line, and on a corner lot, except as otherwise provided in this section, no part of any building shall be created or altered so as to be less than 35 feet from any street line.

B. No part of any garage or other accessory building situated within 65 feet of any street line shall extend within 15 feet of any lot line intersecting such street which serves as a side lot line located in any residence district or within 15 feet of any street line. An accessory building shall be placed at least five feet from any side lot line.

C. On a corner lot, no part of any building shall be erected or altered so as to be less than 30 feet from any street line.

D. When a dwelling or its attached garage is to be erected on a lot in a Residence A-1 District adjoining a business or industrial district, the setback from the street line on which it faces need not exceed 30 feet.

E. Existing open porches which are 30 feet or more from the street line may be enclosed on one or more sides with glazed enclosures.

§ 180-20. Yards.

A. Side yards. There shall be a side yard between a principal building and each side lot line which shall be 15 feet wide in its least dimension. Detached garages or accessory buildings shall be placed at least five feet from a side lot line if located more than 65 feet from a street line.

B. Rear yards.

(1) There shall be a rear yard on every lot between the principal building and the rear lot line. It shall be not less than 25 feet deep in its least dimension.

(2) A one-story accessory building shall be placed at least five feet from the rear lot line. A one-and-one-half-story accessory building shall be placed at least 10 feet from the rear lot line.

§ 180-21. Lot size.

No lot shall have a frontage of less than 125 feet on a street or an area of less than 17,000 square feet.

§ 180-22. Lot coverage.

No principal building shall be erected or altered so as to cover more than 30% of the area of the lot on which it is located.

ARTICLE III
Residence A-2 Districts

§ 180-23. Permitted uses.

In any Residence A-2 District as indicated on the Building Zone Map, no building or other structure shall be erected, altered or used and no land shall be used or occupied for any purpose except one or more of the following:

A. Any use permitted in a Residence A-1 District.

B. A one-family detached dwelling for one housekeeping unit only; provided, however, that the Board of Appeals, upon an appeal from an order or decision made by the Inspector of Buildings and if it deems such action wise and if it shall appear to the Board that such action will tend to preserve the standard and character of the neighborhood, may authorize a variation in the use of a one-family dwelling existing at the time of the adoption of this Article so that such dwelling may be altered and improved and facilities added for a second housekeeping unit. In all such cases the petitioner, as a condition precedent to the privilege herein granted, shall present adequate plans setting forth the changes and improvements to be made and shall have secured the written consent and approval of at least three of the following property owners:

(1) The owner of the lot on either side of the petitioner's property.

(2) The owner of the lot adjacent in the rear of the petitioner's property.

(3) The owner of the lot directly across the street therefrom. Where the petitioner is the owner of a lot on either side, in the rear or across from the property for which a variation is requested, such lot shall be omitted, in which case written consent and approval shall be secured from the owner of the property next to that owned by the petitioner. In case there are two or more lots adjacent in the rear or sides of the petitioner's property, the owner of the lot which abuts the greater length on the petitioner's property shall be deemed the owner of the lot adjacent to the petitioner's property, as used in this section.

In the case of an appeal for a variation involving a dwelling situation on a corner lot or so located that the obtaining of the exact numerical assents of the owner above enumerated is unreasonable or impossible, the Board of Appeals may grant the variation, provided that the consents of the property owners are obtained substantially in accordance with the principals herein set forth as may be determined by the Board of Appeals. The power to authorize such variation of the use of existing dwellings shall be within the sound discretion of the Board of Appeals, and no variation in use shall be granted unless it shall be clear that the relief requested will not be detrimental to the best interests of the vicinity and will be in harmony with the general purpose and intent of this chapter. Each case shall be considered on its own merits, and no case shall raise a presumption in favor of any other case. No decision of the Board of Appeals shall be considered as changing or affecting the zoning of any Residence A-2 District.

C. The office or studio of a dentist, artist, architect, professional engineer or teacher of scholastic subjects residing on the premises or a beauty parlor wherein one of the residents is the sole operator. The space occupied by such office, studio or parlor shall not exceed

20% of the total floor area of the dwelling, exclusive of the basement. No display, sign or other advertising devise shall be permitted except an interior illuminated, reflective or nonilluminated professional nameplate having an area of not more than 144 square inches. The studios or offices of dancing or music teachers, photographers, masseurs, veterinarians, riding schools and other similar businesslike pursuits are prohibited.

D. The renting of rooms and the furnishing of table board to not more than four resident persons in a dwelling occupied as a private residence. No display, sign or other advertising device, illuminated or otherwise, shall be visible from the street except a nonilluminated announcement sign having an area of not more than 144 square inches.

E. Schools for academic purposes only and community center buildings, except dancing or bowling and like activities, provided that there is no display or advertising visible from the street, other than as permitted in Subsection C of this section.

F. Colleges, public libraries or museums, churches or other places of worship, parish houses and Sunday school buildings.

G. Private kindergartens and day nurseries conducted in otherwise permitted buildings in this district, provided that not more than 25% of the floor area of the building, exclusive of the basement, is used primarily for this purpose.

H. Bus passenger stations or shelters, not including repair service or garaging.

I. Telephone exchange buildings.

J. Accessory buildings and uses customarily incident to any use permitted in this section, provided that such use shall not be offensive or dangerous to life by reason of health or fire, and provided further that such accessory use shall not include any activity conducted for gain. No advertising device, whether illuminated or otherwise, shall be permitted, except that an interior illuminated, reflective or nonilluminated announcement sign having an area of not more than 144 square inches may be displayed.

K. The keeping and raising of poultry, livestock and pigeons, whether for the table or other purposes, or other like objectionable uses are prohibited.

L. Private garages, provided that no business, service or industry is conducted therefrom or therein. Not more than one motor vehicle for each 5,000 square feet of lot area or fraction thereof, nor more than five motor vehicles, not more than one of which may be unregistered, shall in any case be kept on the premises. Only one such vehicle may be a commercial vehicle and of not more than 3/4 ton's weight of capacity. Space for motor vehicles shall not be leased or rented for commercial vehicles. No commercial vehicles shall be parked on a lot in the open. These space regulations shall apply to vehicles regularly left on the lot, whether housed or in the open.

M. Not more than one house trailer may be kept on the premises. The trailer shall not be used for living quarters while so located. Space shall not be leased or rented for trailers.

N. Uses outlined in § 180-37B and C, when the line separating a Residence A-2 District from an Agricultural District runs through a property not being used for agricultural purposes so that the future use of the whole property for agricultural purposes would be prohibited.

§ 180-24. Height regulations.

A. A residence building shall not exceed 2 1/2 stories or more than 35 feet in height. Other buildings such as schools, telephone exchanges and community center buildings and other uses permitted in § 180-23E shall not exceed 50 feet in height. Chimneys, steeples and flag or radio poles are exempt from the height provision of this section.

B. Accessory buildings or structures, including private garages, shall not exceed 17 feet in height for a one-story building. A one-and-one-half-story accessory building shall not exceed 25 feet in height.

§ 180-25. Setback requirements.

A. No part of any building shall be placed within 30 feet of any street line.

B. No part of any garage or other accessory building situated within 65 feet of any street line shall extend within 15 feet of any lot line intersecting such street which serves as a side lot line located in any residence district or within 15 feet of any street line.

C. On a corner lot, no part of any building shall be erected or altered so as to be less than 25 feet from any street line.

D. Open porches which are 20 feet or more from the street line may be enclosed on one or more sides with glass enclosures.

§ 180-26. Yards.

A. Side yards.

(1) There shall be a side yard between a principal building and any side lot line which shall be 15 feet wide in its least dimension.

(2) Detached garages or accessory buildings shall be placed at least five feet from the side lot line if located more than 65 feet from a street line.

B. Rear yards.

(1) There shall be a rear yard on every lot between the principal building and the rear lot line. It shall be 20 feet deep in its least dimension.

(2) One-story accessory buildings shall be placed at least five feet from the rear lot line, and one-and-one-half-story accessory buildings shall be placed at least 10 feet from the rear lot line.

§ 180-27. Lot size.

No lot shall have a frontage of less than 110 feet nor an area of less than 15,000 square feet.

§ 180-28. Lot coverage.

No principal building shall be erected or altered so as to cover more than 40% of the area of the lot on which it is located.

ARTICLE IV
Residence A-3 Districts

§ 180-29. Use restrictions.

In a Residence A-3 District as indicated by the Building Zone Map, no building or other structure shall be erected, altered or used and no land shall be used or occupied for any purpose except for apartment houses or garden-type apartments and accessory uses incident thereto and subject to the following restrictions:

A. Subdivision control will not apply except insofar as it applies to road construction, surface drainage and utilities.

B. The project shall be located on a lot containing not less than two acres and contain not more than eight family dwelling units per acre of lot area. The building coverage shall not exceed 40% of the lot area. The minimum lot frontage on a street shall be 150 feet.

C. No building shall be located nearer than 40 feet to a street line or other property line.

D. There shall be a landscaped strip of not less than 15 feet in width appropriately planted with lawn, trees and shrubs adjacent and parallel to all property lines of the site.

E. There shall be a landscaped foundation strip of not less than 10 feet in width between each building and any roadway, drive or street. Such strip shall contain a six-foot-wide grassed and planted area and four-foot-wide sidewalk adjacent to any roadway, drive or street within the project.

F. No building shall be more than two stories in height, exclusive of the basement. The basement shall not contain any living quarters.

G. The minimum distance between any two buildings on the same lot shall in no case be less than 40 feet.

H. Floor area.

   (1) No building shall contain more than eight family dwelling units, and no dwelling unit shall contain less than the following minimum floor areas:

      (a) One-bedroom units: 400 square feet.

      (b) Two-bedroom units: 600 square feet.

      (c) Each additional room: 120 square feet.

   (2) In computing floor area, only the space within the dwelling unit used exclusively for living purposes shall be considered. Halls, closets, stairways, bathrooms and lavatories are expressly excluded from this computation.

I. All stairways are to be contained within the building structure proper.

J. Each dwelling unit shall have access to not fewer than two egresses remote from each other and so arranged that to reach one egress it will not be necessary to pass through a common corridor or hallway which serves the other egress. The term "egress" is as defined in § 101.0 of the Department of Public Safety, Board of Standards, Building Code.

K. Parking space shall be provided at the rate of two spaces for each family dwelling unit. Each space shall contain a minimum of 200 square feet and shall be located at least 25 feet from any principal building, except that if garage parking is to be located within the building, it must comply with the rules and regulations governing construction of garages contained in Form FPR-4 of the Massachusetts Department of Public Safety, Board of Fire Prevention Regulations.

L. There shall be no provision for parking on roadways, drives or streets.

M. The balance of the lot not used for buildings, roadways, streets or parking areas shall be suitably planted and landscaped and maintained.

N. Space contained in apartment units or garden-type apartment units shall not be used, rented or leased for any commercial or business uses.

O. The plans for any such apartment or garden-type apartment shall be submitted to the Planning Board for its approval as to site layout, provisions for handling vehicular traffic flow, parking area and landscaping before a building permit is issued.

ARTICLE V
Residence A-4 Districts

§ 180-30. Use restrictions.

In a Residence A-4 District as indicated by the Building Zone Map, no building or other structure shall be erected, altered or used, and no land shall be used or occupied for any purpose except for an elderly housing development, constructed by and under the jurisdiction of the Agawam Housing Authority, and the accessory uses incident thereto, including an administration and recreational building, and subject to the following restrictions:

A. The development shall be located on a lot containing not less than seven acres and containing not more than 16 family dwelling units per acre of lot area. Not more than 12 dwelling units may be constructed in each building.

B. Subdivision control will not apply except insofar as it applies to road construction, surface drainage and utilities.

C. No building shall be located nearer than 40 feet to the property line. There shall be a landscaped strip of not less than 15 feet in width appropriately planted with lawn, trees and shrubs adjacent and parallel to all property lines of the site.

D. No building shall be more than two stories in height, exclusive of the basement. The basement shall not contain any living quarters.

E. All stairways are to be contained within the building structure proper.

F. Each dwelling unit shall have access to not fewer than two egresses remote from each other and so arranged that to reach one egress it will not be necessary to pass through a common corridor or hallway which serves other egresses. The term "egress" is as defined in § 101.0 of the Department of Public Safety, Board of Standards, Building Code.

G. Parking space shall be provided at the rate of one space for each family dwelling unit. Each space shall contain a minimum of 200 square feet. If garage parking is to be located within the building, it must comply with the rules and regulations concerning construction of garages contained in Form FPR-4 of the Massachusetts Department of Public Safety, Board of Fire Prevention Regulations.

H. The balance of the lot not used for buildings, roadways, drives, streets or parking area shall be suitably planted and landscaped and maintained.

I. The plans for any such development shall be submitted to the Planning Board for its approval as to site layout, provisions for handling vehicular traffic flow, parking area and landscaping before a building permit is issued.

ARTICLE VI
Residence B Districts

§ 180-31. Permitted uses.

In any Residence B District as indicated on the Building Zone Map, no building or other structure shall be erected, altered or used and no land shall be used or occupied for any other purpose except one or more of the following:

A. Any use permitted in a Residence A-1 or A-2 District.

B. A two-family dwelling for two housekeeping units. A semidetached dwelling for two families, provided that there shall not be more than one family in each half of such dwelling.

C. Notwithstanding any other provision in the above paragraph, no building or other structure shall be erected, altered or used for residential purposes which shall accommodate or house more than four families. All four-family buildings or structures used for residential purposes shall be erected on a parcel of land containing not less than one acre in area and having not less than 150 feet of frontage on a street.

D. Lodging houses, provided that there is no display, sign or other advertising device visible from the street, whether illuminated or otherwise, other than a sign having an area of not more than 144 square inches. A public restaurant or dining room shall be permitted as an accessory use in any part of such building, provided that the dining room and kitchen facilities do not occupy more than 75% of the first-floor area of such building.

E. Clubs, lodges and social center buildings, except those whose chief activity is a gainful service or activity usually conducted as a business, including in such excepted uses dancing or bowling and like activities, provided that there is no display or advertising visible from the street other than that permitted in Subsection D of this section.

F. Hospitals, sanitariums or charitable institutions, except those for contagious diseases, for the care of epileptics or drug or liquor patients, for correctional purposes or for the care of the insane or feebleminded.

G. Private garages, provided that no business, service or industry is conducted therefrom or therein. Not more than one motor vehicle shall be kept for each 2,500 square feet of lot area, except that three vehicles may be kept, in any case, not more than one of which may be unregistered. Only one such vehicle may be a commercial vehicle of not more than 1 1/2 tons' weight of capacity. Space shall not be leased or rented for a commercial vehicle. No commercial vehicle shall be parked on a lot in the open. These space regulations shall apply to vehicles regularly left on the lot, whether housed or in the open.

H. Not more than one house trailer for each resident family may be kept on the premises. The trailer shall not be used for living quarters while so located. Space shall not be rented or leased for trailers.

§ 180-32. Height regulations.

A. A dwelling or lodging house shall not exceed 2 1/2 stories or 35 feet. Churches, schools, colleges, libraries, Town buildings, clubs, lodges, social center buildings, hospitals and

such institutional buildings shall not exceed 50 feet in height. Chimneys, steeples and flag or radio poles are exempt from the height provisions.

B. Accessory buildings or structures, including private garages, shall not exceed 17 feet in height for a one- or one-and-one-half-story building. A two-story accessory building shall not exceed 25 feet in height.

§ 180-33. Setback requirements.

A. No part of any building or other structure shall be erected or altered so as to be nearer to the street line of any street on which it faces than the nearest building on either side thereof facing on the same street and within the same block and zoning district, but in no case need the required setback be greater than 30 feet.

B. Where the alignment of a building is not controlled by the preceding subsection, no part of any building shall be placed within 20 feet of the street line.

C. No part of any garage, stable or other accessory building situated within 65 feet of any street line shall extend within 15 feet of any lot line intersecting such street which serves as a side lot line located in any residence district or within 15 feet of any street line.

D. On a corner lot, except as otherwise provided in this section, no part of any building shall be erected or altered so as to be less than 20 feet from any street line.

E. Existing open porches which are 15 feet or more from the street line may be enclosed on one or more sides with glazed enclosures.

§ 180-34. Yards.

A. Side yards. There shall be a side yard between a building and each side lot line. For a building of four stories or over 45 feet in height, it shall be not less than 25 feet in width in its least dimension; for a building of three stories or over 35 feet in height, it shall be not less than 20 feet wide in its least dimension; for one-, one-and-one-half-, two- or two-and-one-half-story buildings, the side yard shall be not less than 15 feet wide in its least dimension.

B. Rear yards. There shall be a rear yard on every lot between the principal building and the rear lot line. It shall be 20 feet deep in its least dimension. One-story accessory buildings shall be placed at least five feet from the rear lot line, and one-and-one-half- or two-story accessory buildings shall be placed not less than 10 feet from the rear lot line.

§ 180-35. Lot size.

No lot shall have a frontage of less than 100 feet on a street or an area less than 12,000 square feet.

§ 180-36. Lot coverage.

No principal building shall be erected or altered so as to cover more than 40% of the area of the lot on which it is located.

ARTICLE VII
Agricultural Districts

§ 180-37. Permitted uses.

In any Agricultural District as indicated on the Building Zone Map, no building or other structure shall be erected, altered or used and no land shall be used or occupied for a purpose except one or more of the following:

A. Any use permitted in a Residence A-1 or A-2 District.

B. Farms, dairies, nurseries, truck gardens, greenhouses and natural ice-harvesting activities and buildings or structures accessory thereto.

C. Buildings or shelters for the sale of farm products, provided that a major portion of the products offered for sale at all times are raised on the premises and no advertising of products other than those raised on the premises shall be displayed.

D. The processing of forests and wood lots by portable woodworking mills and machinery for processing wood cut on the premises, if approved by the Board of Appeals.

E. Airports and landing strips and buildings or structures necessary thereto, if located west of Suffield Street.

F. Off-street parking for 24 hours or less for motor vehicles when the use is an accessory to an existing conforming amusement park containing at least three acres of land adjacent to agriculturally zoned land and by special permit. **[Added 2-20-2001 by TOR-2001-1]**

§ 180-38. Height regulations.

Buildings or structures permitted in this zone under § 180-37A shall not exceed the heights permitted in § 180-24 of this chapter. For other buildings permitted by this Article, the height limitation shall be 50 feet.

§ 180-39. Setback requirements.

A. Buildings and shelters for the sale of farm products shall be at least 35 feet from the street line.

B. Dwellings with or without attached garages shall be at least 35 feet from the street line. All other buildings of whatever description shall be at least 100 feet from the street line.

§ 180-40. Yards.

A. Side yards. There shall be a side yard between any building and any side lot line. It shall comply with the side yard requirements of the nearest residence district measured in a direct or air line.

B. Rear yards. For a residence, accessory building or other structure, the rear yard shall comply with the rear yard requirement of the nearest residence district measured in a direct or air line.

§ 180-41. Lot size.

No lot shall be used for residence purposes with a frontage of less than 120 feet on a street or an area of less than 20,000 square feet.

§ 180-42. Lot coverage.

There shall be no lot coverage regulations in this district.

§ 180-43. Special use requirements.

A. Landscaped administrative offices, laboratories devoted to research, design or experimentation and processing and fabrication incidental thereto and appurtenant buildings consistent with and designed to promote and benefit the value and use of property in residential districts or in areas which are predominantly residential although partly lying in less restricted districts, provided that no materials or finished products shall be manufactured, processed or fabricated on such premises for sale except such as are incidental to such laboratory research, design or experimentation conducted on such premises.

B. The special use established must be on plots having a minimum of 20 acres, must have a two-hundred-foot front yard and 100 yards along all other lot lines and must provide off-street parking for employees and visitors. Pointed masonry block and cinder block walls with struck joints will be permitted for rear and side walls of buildings. Brick masonry exterior walls, curtain walls of decorated colored aluminum, enameled colored steel, stainless steel walls and glass walls are permitted for exterior uses. If the front yard is on an interior lot line, 200 feet of setback shall apply to this lot line. The only sign permitted must be in front of the building and subject to Planning Board approval. Traffic directional and parking signs must be not more than four feet high from the ground level. Not over 25% of the land shall be used for building purposes.

C. Landscaped rest homes or convalescent homes, except those for contagious diseases, for the care of drug or liquor patients, for correctional purposes or for the care of the insane or feebleminded. Rest homes or convalescent homes must be on plots having a minimum of 10 acres, must have a one-hundred-foot front yard and fifty-foot yards along all other lot lines and must provide off-street parking for employees and visitors. Not over 25% of the land shall be used for building purposes.

D. Nonprofit golf courses shall be permitted. Golf courses operated for profit shall be permitted with that portion of land covered by a clubhouse to be zoned Business A. All golf courses must be on plots having a minimum of 75 acres.

E. To assure that special use structures shall be reasonably attractive in appearance, the builder or his representative shall submit to the Planning Board, in addition to other requirements, an architect's rendering or comparable illustration of the planned construction, including landscaping, prior to applying for a building permit. Unless such a drawing approved by the Planning Board is submitted to the Inspector of Buildings, no permit for a building shall be issued, nor shall an occupancy permit be granted, unless and until the finished structure conforms to the drawing submitted.

F. Not more than one motor vehicle per 5,000 square feet of lot up to a limit of five motor vehicles shall be kept in accordance with Chapter 91 of the General Laws, only one of which can be an unregistered vehicle, exclusive of farm equipment.

ARTICLE VIII
Business A Districts

§ 180-44. Permitted uses.

In any Business A District as indicated on the Building Zone Map, no building or other structure shall be erected, altered or used and no land shall be used or occupied for any purpose except one or more of the following:

A. Any use permitted in a residence district or an Agricultural District.

B. The major use of a building or structure in this district shall be to store and display goods for sale at retail on the premises or to furnish a service intended for residents of the immediate vicinity. Banks, hotels, dining establishments, halls and office buildings shall be considered as complying with such requirements.

C. No building, structure or land shall be used in whole or in part for any fabricating, manufacturing, converting, altering, finishing or assembling.

D. One-story public garages for storage or repair of not more than 50 cars. Body and fender work and the painting or selling of cars in or out of doors is prohibited. The storage of dismantled vehicles or vehicle parts out of doors is prohibited. The storage of complete units such as truck bodies, tailgates, road sanders, farm machinery, school buses and ambulances is permitted. An underground tank of not more than 1,000 gallons' capacity for drain oil is permitted. **[Amended 11-15-2004 by TOR-2004-17]**

E. A gasoline filling station, which shall include self-service gasoline filling or service stations, provided that not more than 30,000 gallons of gasoline shall be stored on the premises. An enclosed lubritorium for not more than three motor vehicles shall be permitted. Only minor repairing of motor vehicles is permitted. **[Amended 12-2-2002 by TR-2002-53]**

(1) For the public purpose to promote and protect the health, safety, and welfare of the residents of the Town of Agawam, to prevent and control fires, and to control traffic, it is deemed to be in the best interests of the Town of Agawam to regulate the number of gasoline filling stations within the Town of Agawam.

(2) For the purpose of licensing gasoline service stations under the provisions of Massachusetts General Laws Chapter 148, § 13, there shall be no more than 20 issued at any one time, and no license shall be issued for a gasoline filling station located within 200 feet of a residence, school or church.

F. (Reserved)[9]

G. Cabins, if licensed under MGL c. 140, § 32A to 32E, inclusive.

H. Drive-in restaurants and drive-through restaurants, after a special permit by the Board of Appeals in conformance with § 180-11. At no time shall fewer than 50 parking spaces be provided on site. **[Added 3-21-1994 by TOR-94-1; amended 3-8-2000 by TOR-2000-1]**

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9. Editor's Note: Former Subsection F, which provided for open-air transient parking as a permitted use, was repealed 6-18-2007 by TOR-2007-6.

(1) The parking or loading requirements set forth in this subsection may be reduced as part of the special permit by the Board of Appeals if the Board of Appeals finds that the reduction is not inconsistent with the requirements of the Zoning Bylaws of the Town of Agawam.

(2) If a reduction is allowed, a reserve area, to be maintained indefinitely as landscaped open space, must be required sufficient to adequately accommodate the difference between the parking spaces required (i.e., the sum of the parking spaces required for the separate used individually) and the parking spaces provided. The parking/site plan shall show (in dotted outline) the reserve area laid out in full compliance with any parking or loading requirements as set forth in said Chapter 180, including the required number of spaces. In no event shall the Board of Appeals reduce the parking or loading requirement below 30 spaces.

I. Drive-through service windows utilized by any business shall require a special permit from the Board of Appeals in conformance with § 180-11. **[Added 9-20-1997 by TOR-97-8]**

J. No more than four automatic amusement devices duly licensed in accordance with § 75-1 of the Code of the Town of Agawam. **[Added 9-7-2004 by TOR-2004-5]**

§ 180-45. Height regulations.

A. A business building shall not exceed three stories or 45 feet in height. These provisions shall not apply to chimneys, flag or radio poles, water tanks or hose towers or required bulkheads or elevator penthouses. A residence building shall comply with the height requirements for Residence B Districts.

B. Heights of other buildings and structures permitted in this zone under § 180-44A shall not exceed the height permitted in Residence B Districts.

§ 180-46. Setbacks; yards; loading areas.

A. Setbacks shall be at least 35 feet.

B. Side yards are not required for business buildings.

C. Rear yards shall have a minimum of 25 feet.

D. Space shall be provided for vehicle parking and for the loading and unloading of all materials, equipment and merchandise on the premises and entirely off the traveled way, with such additional space as may be necessary to provide free and easy access to that portion of the buildings so as not to interfere with traffic on the public way. Loading and unloading platforms and doorways especially designed for loading and unloading goods are prohibited on the front of any building.

E. A building devoted in whole or in part to residence or other purposes permitted in § 180-44A shall comply with the requirements prescribed for Residence B Districts. **[Amended 4-7-1986 by TOR-86-6]**

§ 180-47. Lot coverage.

A. No business building shall be erected or altered so as to cover more than 50% of the area of the lot upon which it is located. **[Amended 4-7-1986 by TOR-86-6]**

B. Notwithstanding any other provision of this section, no building or other structure shall be erected, altered or used for residential purposes which shall accommodate or house more than four families. All four-family buildings or structures used for residential purposes shall be erected on a parcel of land containing not less than one acre in area and having not less than 150 feet of frontage on a street.

C. Not more than one unregistered motor vehicle shall be allowed on any parcel of land used as a gasoline filling station; provided, however, that any such gasoline filling station having an automobile dealer's permit shall be governed by the provisions of such permit.

ARTICLE IX
Business B Districts

§ 180-48. Permitted uses.

In any Business B District as indicated on the Building Zone Map, no building or other structure shall be erected, altered or used and no land shall be used or occupied for any purpose except one or more of the following:

A. Except as otherwise provided in this article, any use permitted in a Residence, Agricultural or Business A District.

B. Residential buildings and appurtenant buildings such as garages, sheds, barns, etc., presently existing in Business B Districts may be added thereto, altered or rebuilt.

C. In any Business B Districts as indicated on the Building Zone Map, no new building or other structure shall be erected for residential purposes unless the land so located in the Business B District is part of a subdivision plan duly recorded prior to the enactment of this section or unless individual building lots have been similarly recorded.

D. Body and fender work and the painting of cars out of doors is prohibited. The storage of dismantled vehicles or vehicle parts out of doors is prohibited. The storage of complete units such as truck bodies, tailgates, road sanders, farm machinery, school buses and ambulances is permitted. The selling of motor vehicles in or out of doors is prohibited. **[Amended 11-15-2004 by TOR-2004-17]**

E. Amusement parks, bowling alleys and roller skating rinks, or arcades containing six or more pinball or electronic games and/or automatic amusement devices with a special permit issued by the Board of Appeals. No more than five automatic amusement devices duly licensed in accordance with § 75-1 of the Code of the Town of Agawam. **[Amended 12-7-1981; 9-7-2004 by TOR-2004-7]**

F. Wholesale sales and warehousing.

G. Converting, fabricating, manufacturing, altering, finishing or assembling, provided that in no case is a total of more than 20,000 square feet of floor space devoted to such use.

H. Trucking terminals may be allowed only after a public hearing by the Board of Appeals.

I. Retail shopping centers comprised of only one building, planned as a total entity with on-site common parking areas for customer and employee parking provided so as to comprise an efficient and architecturally integrated shopping area. **[Added 2-6-2006 by TOR-2005-12]**

(1) Allowed uses.

(a) Retail shopping centers may include department stores, variety stores, supermarkets, furniture stores, household appliance stores, home improvement stores, lawn equipment stores, gift shops, restaurants, including drive-in and drive-through restaurants, drugstores, barbershops, beauty shops, office supply stores, food stores, optical stores, clothing stores, financial institutions and banks (with or without drive-through windows), health clubs, movie theaters, doctors' offices, dentist offices and other professional offices open to the public,

children's day-care and activity centers. Only one principal building per lot is allowed.

(b) These uses will not include, as a principal or accessory use, motor vehicle services, such as new or used motor vehicle sales, freestanding tire, brake and muffler shops, automobile repair shops, and gasoline stations. No accessory use or building is permitted under this zoning.

(c) Unless by special permit of the Agawam Town Council, temporary outside uses upon the parcel are prohibited, including but not limited to, circuses, festivals, tent sales, sidewalk sales, retail displays, vehicle displays.

(2) Retail shopping center requirements.

(a) Application procedures.

[1] Site plan. Site plans for any such retail shopping center shall be submitted to the Planning Board for its approval as to site layout, provisions for handling traffic flow, parking area, landscaping, traffic, and architectural characteristics before a building permit is issued. To assure that retail shopping centers shall be reasonably attractive in appearance, the developer or its representative shall submit to the Planning Board, in addition to the requirements set forth in § 180-13, an architect's rendering or comparable illustration of the planned construction, including landscaping, prior to applying for a building permit. The architectural concept will be required to fit the character of the community and be at the approval of the Planning Board prior to issuing a building permit. Unless such a drawing approved by the Planning Board is submitted to the Inspector of Buildings, no building permit shall be issued, nor shall an occupancy permit be granted unless and until the finished construction reasonably conforms to the drawing submitted.

[2] Special permit.

[a] No building permit shall be issued for, and no person shall undertake, any use or improvement for a retail shopping center unless an application for a special permit has been prepared for the proposed development in accordance with the requirements and § 180-11. For the purpose of this section, the special permit granting authority shall be the Agawam Town Council.

[b] No building permit shall be granted by the Inspector of Buildings until the Agawam Town Council has given its final approval that the development or any phase thereof and any associated off-site improvements conform to the approved application for a special permit under this section, including any conditions imposed by the Agawam Town Council. No temporary occupancy permits shall be granted.

(b) Parking. No space within the required front setback area may be used for parking unless approved by the Planning Board. An overall shared parking scheme is preferred and developed in such a way that conforms to parking

space requirements for retail shopping centers as specified herein. In the overall shared parking scheme, the applicant shall specify how shared parking areas are to be owned, constructed, operated and maintained and provide the Planning Board with the proposed deeds, deed restrictions, association bylaws or other legal documents or mechanisms for ensuring the same. All parking lots shall be designed according to the following standards:

[1] Minimum 4.5/1,000 overall parking ratio inclusive of all buildings (no unheated garden shop or seasonal retail or wholesale sales);

[2] Minimum size for parking spaces shall be nine feet by 18 feet unless when using angled parking as specified in the Institute of Transportation Engineers, Traffic Engineering Handbook, Parking Class A.

Commented [CM3]: LID Standard would be 9x18 as largest, with accommodation for compact vehicles in smaller spaces

[3] Minimum width for drive aisles shall be:

[a] Twenty-four feet for two-way lanes with ninety-degree angle parking.

[b] Eighteen feet for one-way lanes with sixty-degree angle parking.

[c] Eighteen feet for one-way lanes with forty-five-degree angle parking.

[4] With the exception of parking for the disabled, all other parking spaces shall be located at least 50 feet or greater from any building.

[5] Pavement markings, signage and any other required traffic control devices within the site shall be specified according to the latest edition of the Manual on Uniform Traffic Control Devices (M.U.T.C.D.) standards. All roadway, stop line and traffic markings shall be of thermoplastic.

[6] Pedestrian and handicapped access from the parking areas to the site sidewalks and entrances to all buildings shall be specified to provide safe access and internal circulation within the site.

[7] No overnight parking of vehicles not related to the ongoing operation of the shopping center.

(c) Traffic impact report. A traffic impact report, indicating projected traffic flows to and from the project at its build-out, projected traffic flows and levels of service on nearby roadways in five years and at build-out of the development, current traffic flows, levels of service and accident records for said roadways, projected capacity, service level and safety problems anticipated in five years and at project build-out, proposed mitigation measures and other relevant information shall be submitted as part of the site plan application and presented to the Planning Board at a public meeting by a professional traffic engineer or transportation planner. The area to be included in the traffic impact study shall be determined by the Planning Board. The Planning Board may require traffic signals, traffic or turn lanes, sidewalks, bikeways or any other mitigation measures that it believes necessary to protect public safety and maintain proper traffic flow on roadways within or impacted by the development.

(d) Streets and drives. Streets and drives within the development shall be constructed in accordance with the Planning Board's subdivision regulations, except that the Planning Board may require additional sidewalks, traffic lanes, turn lanes, traffic signals, additional lane width based on truck traffic, additional pavement depth based on truck traffic or other items or increases in existing standards as needed or required. A minimum of two means of egress from a public way must be provided.

(e) Buffers and greenspace. Retail shopping centers shall contain a minimum of 25% greenspace not including parking and/or interior roadways. A space of not less than 100 feet shall be maintained as an open space buffer with natural vegetation or landscaping along and adjacent to agriculturally and residentially zoned property lines. The buffer shall not be built on, have no structures to include barrier fencing, be paved or used for parking, dumpsters and/or storage, but may be utilized for vegetated stormwater management and greenspace only. All buffer areas shall be maintained and kept free of litter. Additional area, plantings, decorative fencing or other items may also be required by the Planning Board to protect adjacent property owners from adverse impacts or to protect the character of the neighborhood, including landscaped berms and/or fences along and adjacent to residentially zoned property lines.

(f) Parking lot interior landscaping. Fifteen percent of the interior space of all parking lots shall be landscaped areas. All parking lot islands, connecting walkways through parking lots and driveways through or to parking lots shall be landscaped according to the following standards:

[1] Visibility. To avoid landscape material blocking driver sight distance at driveway-street intersections, no plant material greater than 24 inches in height shall be located within 15 feet of a curb cut.

[2] Landscape islands. In addition to any pedestrian refuge areas, each landscaped island shall include two, minimum two-and-five-tenths-inch caliper canopy deciduous trees, be of length greater than eight feet in its smallest dimension, include at least 80 square feet of ground area per tree to allow for root aeration, and have raised concrete curbs. If the landscaped islands are located in an area with existing soils classified in the NRCS hydrologic soil groups A/B, such that the existing soils are suitable for infiltration stormwater runoff, the internal landscape areas may/shall be installed at a lower grade than the parking lot pavement, and curbing shall allow drainage from the pavement to enter and percolate through the landscaped areas, while simultaneously protecting the landscape materials.

Deleted: .

[3] Walkways and driveways. Connecting walkways through parking lots shall have two, minimum two-and-five-tenths-inch caliper canopy deciduous trees per 60 linear feet of such walkway planted in landscape areas within five feet of such walkway. Driveways through or to parking lots shall have two minimum two-and-five-tenths-inch caliper canopy deciduous trees per 60 linear feet of and along each side of such driveway, in landscape areas within five feet of such driveway.

[4] Parking bays shall extend no more than 20 parking spaces without an

intervening tree, landscape island or landscape peninsula where landscaped end islands are provided. Where landscaped end islands for parking bays are not provided, an equivalent landscaped area must be provided internally within the parking lot.

[5] Adhere to all existing engineering regulations and requirements.

(g) Lighting. Parking lot lighting shall be as unobtrusive as possible to provide safe circulation and protect people and property. Light sources shall be concealed and fully shielded and shall feature sharp cutoff capability so as to minimize up-light, spill-light, glare and unnecessary diffusion on adjacent property. Unique areas or neighborhoods within the Town may have additional design guidelines for lighting as required by the Planning Board. Maximum on-site lighting levels shall not exceed 10 footcandles, except for loading and unloading platforms where the maximum lighting level shall be 20 footcandles. Lighting levels measured 20 feet beyond the property line of the development site (adjacent to residential uses or public rights-of-way) shall not exceed 0.1 footcandle as a direct result of the on-site lighting. Parking lots shall remain fully lit for one hour following the closing of the store or establishment for which the parking lot serves, and shall be lit by security lighting thereafter. All lighting level measurements shall be determined by mean footcandles over the designated lighted area. Maximum height on lot poles shall be 20 feet and the fixture shall be shielded to prevent excess spillage of light onto adjoining properties.

(h) Outdoor storage areas/mechanical equipment.

[1] No areas for outdoor storage, trash collection or compaction, loading or other such uses shall be located within 100 feet of any public street, public sidewalk or internal pedestrian way, and in no event shall be visible from roadways (such areas will be screened from view, including the use of live plantings such as arborvitae). These enclosed areas for only the above purposes must be shielded by an opaque fence, or site-obscuring landscaping, either of which shall be not less than six feet.

[2] Loading docks, truck parking, outdoor storage, utility meters, HVAC and other mechanical equipment, trash collection, trash compaction and other service functions shall be incorporated into the overall design theme of the building and the landscape so that the architectural design is continuous and uninterrupted by ladders, towers and equipment.

[3] All rooftop mechanical equipment shall be screened.

[4] No outside sales areas/yards are permitted at any time, which include any type of stationary or mobile vendor carts (i.e., food stands).

[5] No temporary or fabric structures shall be used for outdoor storage.

(i) Building facade. All exterior building elevations that face public streets and/or customer parking areas shall be designed so that there are no large expanses of blank walls. This requirement can be met by employing the use of architectural features, including but not limited to the following, doors, windows, pilasters,

columns, horizontal and vertical offsets, material and color variations, decorative cornices, awnings, dormers, pediments and canopies. At least 75% of the building facades shall have decorative block, glass, brick, or other decorative facing, or a combination thereof. Buildings are to have reasonably consistent architectural elements to provide continuity, while allowing individuality in architectural features to distinguish individual businesses. In order to assure conformance with this requirement, exterior building elevations must be reviewed and approved as a part of the overall final site plan process by the Planning Board.

(j) Noise. No outside loudspeaker or audio sound systems shall be installed or used other than for drive-through uses.

(k) Maintenance. All properties developed for commercial purposes, whether they are occupied or not, shall be regularly maintained by the owner of the property to the reasonable satisfaction of the Zoning Enforcement Officer, so that they are not allowed to fall into a state of disrepair or neglect; and they shall consistently present a neat and orderly appearance to the general public as well as adjacent and nearby tenants and property owners. Regular maintenance shall include at a minimum, mowing of lawns, general maintenance of landscaping beds, landscaping irrigation, trash and litter removal, removal of signs, painting/ maintenance of facades and signs, and proper snow removal.

(l) Other requirements.

[1] Minimum size: five acres.

[2] Maximum facility 100,000 square feet, overall single building size. The square footage of a mezzanine shall be included in the calculation of the total square footage.

[3] Minimum frontage: 100 feet.

[4] Front yard setback: 100 feet.

[5] Rear yard setback: 100 feet.

[6] Side yard setback: 100 feet.

[7] Highway setback: 100 feet.

[8] Maximum building coverage shall not exceed 35% of the lot area.

[9] No building within the retail shopping center shall be greater than one story in height. Notwithstanding the foregoing, internal mezzanines (i.e., a low-ceilinged intermediate floor above the ground floor) shall be allowed.

[10] Signage for individual businesses within retail shopping centers shall be allowed as provided by § 180-80. In addition to the signs permitted for the individual businesses, retail shopping centers are allowed one multifaced ground sign at each major street providing access to the property identifying the retail shopping center and any specific uses or occupancies within the shopping center. The maximum signage area for each individual business depicted on the retail shopping center ground sign shall not exceed 100 square feet per face for each individual business. The total maximum signage area for each face of the retail shopping center ground sign shall be limited as follows: a) If the sum of the building area for all

individual businesses within the retail shopping center is less than 100,000 square feet, each face of the retail shopping center ground signage shall not exceed 200 square feet plus 20 square feet per each individual business

listed; b) If the sum of the building area for all individual businesses within the retail shopping center exceeds 100,000 square feet, each face of the retail shopping center ground signage shall not exceed 350 square feet plus 35 square feet per each individual business listed. Ground signs shall not exceed 20 feet in height as measured from the top of the sign. Signage design shall fit the character of the community and be in communion with the architecture of the proposed retail complex as well the surrounding environment. Signage for this type of development requires the approval of the Planning Board. No scrolling, tethered or temporary signs are permitted. Signage per individual establishment shall not exceed 15% of the establishment's facade.

§ 180-49. Height regulations. [Amended 6-6-2005 by TOR-2005-8; 11-5-2008 by TOR-2008-2]

A business building or structure shall not be erected or altered to a height in excess of three stories or more than 45 feet except as expressly provided herein and in § 180-49.1. These provisions shall not apply to chimneys, flag or radio poles, water tanks, hose towers or required bulkheads or elevator penthouses. A residence building shall comply with the height provisions for Residence B Districts. Heights of other buildings or structures permitted in § 180-48A shall not exceed the heights permitted in Residence B Districts. Notwithstanding the foregoing, § 180-49.1 shall govern the height of amusement devices which constitute part of an amusement park.

§ 180-49.1. Amusement park height regulations. [Added 11-5-2008 by TOR-2008-2]

A. An amusement device which constitutes part of an amusement park and which is situated more than 250 feet from the street line and any side lot line shall not be erected or altered to a height in excess of 200 feet, except as expressly provided herein. An amusement device which constitutes part of an amusement park and which is situated within 250 feet from the street line or any side lot line shall not be erected or altered to a height in excess of 45 feet, except as expressly provided herein. Notwithstanding the foregoing, an amusement device which constitutes part of an amusement park may exceed the height limitations contained herein only after issuance of a special permit by the Board of Appeals.

B. Notwithstanding the foregoing, any applicant seeking to erect or alter an amusement device to a height in excess of 45 feet shall be required to send notice by certified mail, postage prepaid, to the abutters and owners of land within 300 feet of the property lines as they appear on the most recent applicable tax list, including those in another city or town. Such notice shall inform such abutters and owners of land of the date, time and location of the Planning Board's public meeting as required under § 180-13C(4) hereof for the applicant's site plan for the proposed amusement device. Such notice shall be sent at least 10 days prior to the Planning Board's public meeting and such notice shall be prepared and mailed by the applicant.

§ 180-50. Setbacks; yards; loading areas.

A. Setbacks and rear yards shall be at least 35 feet in their least dimension.

B. Side yards requirements shall be a minimum of 10 feet, except adjacent to residential or agricultural zones, at which time it would be 15 feet. **[Amended 4-7-1986 by TOR-86-6]**

C. Space shall be provided for vehicle parking and for the loading and unloading of all materials, equipment and merchandise on the premises and entirely off the traveled way, with such additional space as may be necessary to provide free and easy access to that portion of the building so as not to interfere with traffic on the public way. Loading and unloading are prohibited on the front of any building.

D. A building devoted in whole or in part to residence uses shall comply with the requirements for setbacks, side yards and rear yards of the Resident B District.

§ 180-51. Lot coverage. [Amended 4-7-1986 by TOR-86-6]

No business building shall be erected or altered so as to cover more than 50% of the area of the lot on which it is located. A building devoted in whole or in part to residence or other permitted purposes in § 180-48A shall comply with the requirements of lot coverage in Residence B Districts.

§ 180-52. Lot frontage. [Amended 4-7-1986 by TOR-86-6]

No lot shall have a frontage of less than 100 feet on a street or an area less than 10,000 square feet.

§ 180-53. Landscaping.

Commented [CM4]: Are there requirements here, other than that the developer/builder submit a rendering? Should link/reference to the various landscaping requirements for parking lots, etc.? What about for setbacks?

To assure that structures in Business B Districts shall be reasonably attractive in appearances, the builder or his representative shall submit to the Planning Board, in addition to other requirements, an architect's rendering or comparable illustration of the planned construction, including landscaping, prior to applying for a building permit. Unless such a drawing approved by the Planning Board is submitted to the Inspector of Buildings, no permit for a business building shall be issued, nor shall an occupancy permit be granted, unless and until the finished structure conforms in appearance to the drawing submitted.

§ 180-54. Lumberyards; residences; gasoline stations.

A. Secondhand lumberyards and secondhand buildings material yards are prohibited.

B. No building or other structure shall be erected, altered or used for residential purposes which shall accommodate or house more than four families. All four-family buildings or structures used for residential purposes shall be erected on a parcel of land containing not less than one acre in area and having not less than 150 feet of frontage on a street.

C. Not more than one unregistered motor vehicle shall be allowed on any parcel of land used as a gasoline filling station; provided, however, that any such gasoline filling station having an automobile dealer's permit shall be governed by the provisions of such permit.

ARTICLE X
Industrial District A

§ 180-55. Permitted uses. [Amended 11-9-1994 by TOR-94-7 [10]]

In any Industrial District A as indicated on the Building Zone Map, no building or other structure shall be erected, altered or used and no land shall be used or occupied for any purpose except one of the following:

A. Any business or agricultural use permitted in an Agricultural, Business A or Business B District.

B. Any industrial purpose, except those contained in the following list, which may be allowed, by special permit, only after a public hearing before the Board of Appeals: **[Amended 5-5-2014 by TOR-2014-1]**

(1) Acetylene gas, cyanide compound or oxygen manufacture.

(2) Asphalt manufacture or refining.

(3) Chlorine or bleaching powder manufacture.

(4) Creosote manufacture.

(5) Distillation of coal or wood.

(6) Drop forge shop.

(7) Explosives, fireworks or ammunition manufacture.

(8) Fertilizer manufacture.

(9) Fumigation plants.

(10) Glue or size manufacture from fish or animal offal.

(11) Gypsum, cement, plaster or plaster of paris manufacture.

(12) Incineration or reduction of or dumping of offal, garbage or refuse on a commercial basis, except where controlled by the Town.

(13) Junkyards, storage, scrapping of autos and parts and the salvage thereof.

(14) Linoleum manufacture.

(15) Match manufacture.

(16) Paint and lacquer manufacture.

(17) Petroleum refining and the bulk storage of petroleum products.

(18) Plastic manufacture.

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10. Editor's Note: This ordinance provided for the repeal of former Subsection A and the renumbering of former Subsections B and C to A and B, respectively.

(19) Rest homes.

(20) Rubber, natural or synthetic or gutta-percha manufactured from crude or scrap material.

(21) Secondhand lumberyards and secondhand material yards.

(22) Sewage disposal plant, except where controlled by the Town.

(23) Soap, tallow, grease or lard manufacture.

(24) Slaughterhouse.

(25) Sulfurous, sulfuric, nitric or hydrochloric acid manufacture.

(26) Tannery.

(27) Tar or asphalt roofing manufacture.

(28) Tar products manufacture.

(29) Tire recapping or retreading.

(30) Trucking terminals.

(31) All other enterprises or uses commonly regarded as hazardous or offensive.

(32) Assisted living facilities as defined in MGL c. 19D. **[Added 3-20-2006 by TOR-2006-1]**

(33) Registered marijuana dispensary.

(34) Off-site medical marijuana dispensary.

§ 180-56. Height regulations.

Industrial buildings shall not exceed two stories or 40 feet in height, except with approval of the Board of Appeals after a public hearing. These provisions shall not apply to required equipment appurtenant to industrial buildings, except that smokestacks, water tanks, grain elevators and the like are not permissible except after approval of the Board of Appeals after a public hearing.

§ 180-57. Setbacks; yards. [Amended 4-7-1986 by TOR-86-6]

A. Setbacks shall be at least 40 feet wide in their least dimension.

B. Side yard and rear yard requirement shall be a minimum of 25 feet. However, there shall be a side yard and a rear yard between a street and the parts of a building nearest to such street to be no less than 40 feet, but facilities shall be provided for loading and unloading all materials, equipment and merchandise on the premises and entirely off the traveled way.

§ 180-58. Lot coverage. [Amended 4-7-1986 by TOR-86-6]

No business or industrial building shall be erected or altered so as to cover more than 50% of the area of the lot on which it is located.

Commented [CM5]: No buffer requirements, vegetation, fencing, etc?

§ 180-59. Lot size. [Added 4-7-1986 by TOR-86-6]

No lot shall have a frontage of less than 100 feet on a street or an area of less than 40,000 square feet.

§ 180-60. Landscaping; residences; gasoline stations.

Commented [CM6]: Why are these grouped together? Again, no landscaping requirements?

A. To assure that structures in industrial districts shall be reasonably attractive in appearance, the builder or his representative shall submit to the Planning Board, in addition to other requirements, an architect's rendering or comparable illustration of the planned constructions, including landscaping, prior to applying for a building permit. Unless such a drawing approved by the Planning Board is submitted to the Inspector of Buildings, no permit for an industrial building shall be issued, nor shall an occupancy permit be granted unless and until the finished structure conforms in appearance to the drawing submitted.

B. All residential development is prohibited, except that alteration, reconstruction, extension or structural change to any existing residential structure is permitted. **[Amended 11-9-1994 by TOR-94-7]**

C. Not more than one unregistered motor vehicle shall be allowed on any parcel of land used as a gasoline filling station; provided, however, that any such gasoline filling station having an automobile dealer's permit shall be governed by the provisions of such permit.

ARTICLE XI
Industrial District B

§ 180-61. Boundaries.

Industrial B Districts shall be that area bounded by Suffield Street, Silver Street and Shoemaker Lane zoned Industrial at the Town Meeting of December 10, 1957, and those areas zoned Industrial B on or after the Town Meeting of December 10, 1957.

§ 180-62. Permitted uses.

Permitted uses shall be all uses permitted in Industrial District A.

§ 180-63. Height regulations.

Industrial buildings shall not exceed two stories, 40 feet in height, except with approval of the Board of Appeals after a public hearing. These provisions shall not apply to required equipment appurtenant to industrial buildings, except that smokestacks, water tanks, grain elevators and the like are not permissible except after approval of the Board of Appeals after a public hearing.

§ 180-64. Yards; setbacks; loading areas.

Commented [CM7]: Comments re: buffers as above

A. Back and side yards shall be a minimum of 25 feet.

B. Front setback shall be a minimum of 75 feet.

C. Loading platforms and employee parking areas shall be at the rear and side of all buildings.

§ 180-65. Lot size; lot coverage.

A. No lot shall have an area less than 43,560 square feet, one acre, on which a building may be constructed for industrial use, except with approval of the Board of Appeals relative only to previously filed lots whose area is less than one acre; provided that the file lot does not abut an additional parcel owned by the same owner which if combined would meet with the one-acre requirement of this section.

B. Except for office, professional or administrative buildings, no building shall be less than 5,000 square feet in area.

C. No lot shall have frontage of less than 100 feet on a street line; however, this frontage requirement shall not apply to lots established by a deed or plan recorded in the Hampden County Registry of Deeds prior to the first notice of the public hearing on this subsection amendment (March 3, 1994) if, and only if, said parcel of land was not held in common ownership with sufficient adjoining parcels of land on the date of the first notice of public hearing on this subsection amendment (March 3, 1994) to satisfy, in combination, the required 100 feet of frontage on a street line. **[Added 5-2-1994 by TOR-94-5]**

§ 180-66. Landscaping; residences; gasoline stations.

Commented [CM8]: Comments as above

A. To assure that structures in industrial districts shall be reasonably attractive in appearance, the builder or his representative shall submit to the Planning Board, in addition to other requirements, an architect's rendering or comparable illustration of the planned

construction, including landscaping, prior to applying for a building permit. Unless such a drawing approved by the Planning Board is submitted to the Inspector of Buildings, no permit for an industrial building shall be issued, nor shall an occupancy permit be granted unless and until the finished structure conforms in appearance to the drawing submitted.

B. The front of the building must be faced with either brick masonry exterior walls, curtain walls of decorated colored aluminum, enameled colored steel, stainless steel walls or glass wall construction and have an attractive appearance.

C. All buildings in an industrial zone shall be appropriately landscaped with lawns, shrubs and trees.

Commented [CM9]: What is appropriate? Are there any standards the Board uses?

D. All residential development is prohibited, except that alteration, reconstruction, extension or structural change to any existing residential structure is permitted. **[Amended 11-9-1994 by TOR-94-7]**

E. Not more than one unregistered motor vehicle shall be allowed on any parcel of land used as a gasoline filling station; provided, however, that any such gasoline filling station having an automobile dealer's permit shall be governed by the provisions of such permit.

ARTICLE XII
Floodplain Zone
[Added 1-30-1978; amended 6-18-2013 by TOR-2013-5]

Commented [CM10]: See PVPC recommended changes as per state model, March 2021, separate document

§ 180-67. Purpose.

The Floodplain Zone and the regulations herein have been established for the following purposes: to protect and preserve the watercourses and their adjoining floodplain; to reduce the hazards of floods upon the public health, safety and general welfare; to protect floodplain occupants from a flood that is or may be caused by their own land use and that is or may be undertaken without full realization of the dangers therein; to protect the public from the burden of extraordinary financial expenditures for flood control and relief; and to protect the capacity of the floodplain to absorb, transmit and store runoff to assure retention of sufficient floodway area to convey flows which can reasonably be expected to occur.

§ 180-68. Maps; use of other base flood elevation data.

A. The Floodplain District is herein established as an overlay district. The District includes all special flood hazard areas within the Town of Agawam designated as Zone A or AE on the Hampden County Flood Insurance Rate Map (FIRM) issued by the Federal Emergency Management Agency (FEMA) for the administration of the National Flood Insurance Program. The map panels of the Hampden County FIRM that are wholly or partially within the Town of Agawam are Panel Nos. 25013C0377E, 25013C0379E, 25013C0381E, 25013C0382E, 25013C0383E, 25013C0384E, 25013C0387E, 25013C0391E, 25013C0392E, 25013C0401E, 25013C0403E, 25013C0404E, 25013C0411E, and 25013C0413E, dated July 16, 2013. The exact boundaries of the district may be defined by the one-hundred-year base flood elevations shown on the FIRM and further defined by the Hampden County Flood Insurance Study (FIS) report dated July 16, 2013. The FIRM and FIS report are incorporated herein by reference and are on file in the Building Department.

B. In Zone A areas where base flood elevation data is not provided by the Flood Insurance Study, other available data from federal, state or other sources shall be utilized as a basis of determining the base flood level for purposes of enforcing the provisions of this article.

§ 180-69. Permitted uses.

In those portions of the Town so designated in § 180-68, the following uses of land shall be permitted, provided that all necessary state or federal permits are obtained:

A. Conservation of water, plants and wildlife.

B. Legally permitted outdoor recreation not requiring development or landscape alteration in conflict with the purpose of this zone.

C. Grazing, forestry and other farms or agriculture consistent with the purposes of the zone.

D. Dwellings lawfully existing prior to the adoption of these provisions; however, no building permits for substantial improvements or extensions shall be granted unless a special permit is granted by the Board of Appeals.

E. Proper operation and maintenance of dams and other water control devices.

F. Construction and maintenance of highways, streets, sidewalks, sewers, water mains, storm drains, utilities and related facilities by governmental agencies, provided that the water and sewer systems and utilities be designed and constructed to minimize flood damage and to minimize or eliminate infiltration of floodwater into the systems and discharges from the systems into floodwaters.

G. The following uses by special permit as provided by § 180-71, if determined to be consistent with the purpose of this zone, said determination to be made by the Board of Appeals following application for a special permit by the landowner or owner:

(1) Developed recreation facilities, except buildings.

(2) Utility lines and facilities.

(3) Dams and other water control facilities, if in an authorized plan by a public agency or if built to create ponds for recreational or agricultural use.

(4) Minor buildings incidental to permitted flood control, recreation, agricultural, etc., uses, and not exceeding 200 square feet in ground coverage, if constructed so as to not obstruct natural hydrological features.

(5) In the floodway fringe, the Zone AE, Zone A, that portion of the Floodplain Zone outside the floodway, the development of structures for residential use only if the lowest floor (including the basement) is elevated to or above the level of the base flood (one-hundred-year flood) and the development of structures for nonresidential use only if the lowest floor (including the basement) is elevated to be above the level of the base flood (one-hundred-year flood) or, together with the attending utility and sanitary facilities, is floodproofed to or above the level of the base flood (one-hundred-year flood), provided that a special permit is issued by the Board of Appeals. The term "floodproofed" shall mean watertight, with walls substantially impermeable to the passage of water and with structural components having the capacity of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.

§ 180-70. Prohibited uses.

A. In those portions of the Town so specified in § 180-68 as "floodplain," the following uses of land shall be prohibited:

(1) The bulk storage of buoyant, flammable, explosive or toxic materials.

(2) The addition, removal or transfer of such quantities of material, including trees, shrubs, and ground cover, that would reduce the water storage capacity of the floodplain, obstruct the flow of floodwaters in a floodway or otherwise adversely affect the natural hydrology of the area to the extent that the base flood elevation would be raised cumulatively more than one foot.

(3) The digging or drilling of a well intended as a source of domestic water.

(4) The installation of septic tank or leaching fields or on-site waste disposal systems.

(5) The placement or location of a mobile home or the creation of mobile home parks or subdivisions.

B. In land within the floodway the following uses of land shall be prohibited, in addition to those listed above:

(1) Any development within the portions of the Town so specified as "floodway" on the Flood Insurance Rate Map.

(2) Erection, construction or other creation or installation of any building, dam or other structure.

(3) Any use or structure which would result in any increase in flood levels during the base flood discharge. Encroachments, including structures, are prohibited in the regulatory floodway which would result in any increase in flood levels within the community during the occurrence of the base flood discharge.

§ 180-71. Special permit.

A. The application for a special permit shall include a plan prepared and certified by a professional engineer or land surveyor registered in the Commonwealth of Massachusetts. This plan will show all proposed and existing buildings, structures, roads, ways, drainage facilities and landscape features, including wetlands, trees and the like, and other engineering and hydrological data the Board finds necessary. The plan will show all existing and proposed finished ground contours at one-foot intervals.

B. The application for a special permit shall also include an environmental impact statement prepared by an environmentally qualified registered professional engineer. This statement will describe the impact upon the physical environment of the proposed use.

C. The Board of Appeals may waive the requirements of Subsection B if it determines that the probable impact upon the physical environment of the proposed use is to be minimal and that an environmental impact statement is not necessary to its consideration of the application and provided there is no direct conflict with the Laws of the United States and the Commonwealth of Massachusetts.

D. The applicant shall provide the Board with an original and seven copies of the request and of any plan and/or environmental impact statement required under Subsections A and B above. The Board of Appeals shall within seven days forward one copy of each to the Inspector of Buildings, Planning Board, Board of Health and Conservation Commission. These agencies may file written recommendations with the Board of Appeals within 30 days of receipt of notification. The Board of Appeals shall not grant approval of an application for a special permit until these recommendations have been received or until expiration of said thirty-day period.

E. In passing upon such request, the Board of Appeals shall consider all technical evaluations, all relevant factors, standards specified in other sections of this article and:

(1) The danger that materials may be swept onto other lands to the injury of others.

(2) The danger to life and property due to flooding or erosion damage.

(3) The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner.

(4) The importance of the services provided by the proposed facilities to the community.

(5) The necessity to the facility of a waterfront location, where applicable.

(6) The availability of alternative locations, not subject to flooding or erosion damage, for the proposed use.

(7) The compatibility of the proposed use with existing and anticipated development.

(8) The relationship of the proposed use to the Comprehensive Plan and Floodplain Management Program for that area.

(9) The safety of access to the property in times of flood for ordinary and emergency vehicles.

(10) The expected heights, velocity, duration, rate of rise and sediment transport of the floodwaters and the effects of wave action, if applicable, expected at the site.

(11) The costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical and water systems and streets and bridges.

F. The Board of Appeals may issue a permit under this section if it finds that the proposed use of the premises will not endanger the health and safety of the occupants of land within the floodplain or the public, or it may issue a permit with such conditions as it deems necessary to protect the health and safety of the occupants and the public or provide proper flood control or protection, or it may deny the application. The burden of showing that the proposed development will not endanger health and safety and that it will be an appropriate use of the land shall rest upon the developer, who shall provide such additional engineering and hydrological data as the Board of Appeals deems necessary. The Board shall, as a condition of approval, require that effective notice be given to prospective purchasers or existing landowners, by signs, notation on plans and permits or otherwise, of past flooding of said premises and the steps undertaken by the petitioner or his successor in title to alleviate the effects of the same.

G. Without limiting the generality of the foregoing, the Board shall ensure that:

(1) New construction or substantial improvements of residential structures within the Floodplain Zone will have the lowest floor (including the basement) elevated to or above the level of the one-hundred-year flood.

(2) No use or structure shall be located in the designated floodway which would result in any increase in flood levels during the base flood discharge.

(3) No fill or encroachment within the designated floodway shall be permitted that would impair its ability to carry and discharge the waters resulting from the one-hundred-year flood, unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachments would not result in any increase in flood levels during the occurrence of the base flood discharge.

(4) All other necessary permits for the proposed development, as defined in § 180-2, have been received from those federal, state or local governmental agencies from which price approval is required.

(5) Adjacent communities and the Massachusetts Department of Conservation and Recreation, at 251 Causeway Street, Suite 600-700, Boston, Massachusetts 02114, are notified prior to any alteration or relocation of a watercourse, and that evidence of such notification is submitted to FEMA, at 99 High Street, 6th Floor, Boston, MA 02110, and that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained.

(6) New or replacement water supply systems and/or sanitary sewerage systems to be located in the Floodplain Zone shall be designed to minimize or eliminate infiltration of floodwaters into the systems and discharges from the systems into floodwaters.

(7) All subdivision proposals must be designed to assure that:

(a) Such proposals minimize flood damage;

(b) All public utilities and facilities are located and constructed to minimize or eliminate flood damage; and

(c) Adequate drainage is provided to reduce exposure to flood hazards.

(8) In a riverine situation, the Building Inspector shall notify the following of any alteration or relocation of a watercourse:

(a) Adjacent communities and bordering states;

(b) NFIP State Coordinator, Massachusetts Department of Conservation and Recreation, at 251 Causeway Street, Suite 600-700, Boston, MA 02114-2104;

(c) NFIP Program Specialist, Federal Emergency Management Agency, Region I, at 99 High Street, 6th Floor, Boston, MA 02110.

(9) Base flood elevation data is required for subdivision proposals or other developments greater than 50 lots or five acres, whichever is the lesser, within unnumbered A Zones.

(10) In Zones A and AE, along watercourses that have not had a regulatory floodway designated, the best available federal, state, local, or other floodway data shall be used to prohibit encroachments in floodways which would result in any increase in flood levels within the community during the occurrence of the base flood discharge.

§ 180-72. General stipulations.

A. A subdivision filed with the Planning Board under Chapter 41 of the General Laws of Massachusetts shall meet the rules and regulations of the Planning Board as they apply to floodplain management.[11] The subdivision as approved by the Planning Board may be considered a single application when submitted to the Board of Appeals under this article. The action of the Planning Board shall in no way limit the Board of Appeals in its decision and setting of conditions.

11. Editor's Note: See Art. VII, Floodplains, of Ch. 159, Subdivision of Land.

B. Nothing contained in this article shall limit the authority of the Board of Health with respect to premises in the Floodplain Zone or affect the applicability of the Building Code[12] to any building in the Floodplain Zone.

C. A building permit issued by the Inspector of Buildings before the effective date of this article shall be deemed to be a permit hereunder.

D. Any plans or applications submitted to any board, agent or authority of the Town which concerns land within the floodplain shall be noted: "This proposal is for land which lies in the floodplain and meets the requirements of the Floodplain Ordinance."

E. Any existing nonconforming uses or structures in the designated floodway shall not be substantially improved but may be modified, altered, repaired or reconstructed, subject to regulations pertaining to nonconforming uses, to incorporate floodproofing measures, provided that such measures or such modification, alteration, repair or reconstruction do not raise the level of the one-hundred-year flood at any point.

F. No new construction, alteration or extension of a structure for human occupancy as permitted under § 180-71 shall be allowed beyond the foundation stage until the elevation of the lowest floor (including the basement) has been checked and certified, in writing, to the Inspector of Buildings or as being the elevation as stated on the approved plans or higher. All final grades or any change in topography shall be checked and certified, in writing, as being according to the approved plans. Inspection and certification shall be made by a registered professional engineer or land surveyor. All costs incurred under this section shall be borne by the applicant. Records of these elevations and certifications shall be maintained in the office of the Inspector of Buildings and shall be open to public inspection.

G. Where interpretation is needed as to the exact location of the boundaries the Floodplain Zone (for example, where there appears to be conflict between a mapped boundary and actual field conditions), the Building Inspector shall consult the NFIP Program Specialist, FEMA and/or the NFIP State Coordinator at the Massachusetts Department of Conservation and Recreation for the necessary interpretation.

§ 180-73. Securities or bond required.

The completion of all earth work not bonded or covenanted under Chapter 41 of the General Laws of Massachusetts shall be guaranteed with the Town of Agawam by securities or bond as required by the Town prior to commencement by any earth work.

§ 180-74. Severability.

The invalidity of any section or provision of this article for regulation of the floodplain shall not invalidate any other section or provision hereof.

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12. Editor's Note: See Ch. 82, Building Construction.

ARTICLE XIII
Signs
[Added 9-12-1977; amended 4-1-1991 by TOR-91-1; 12-18-2006 by TOR-2006-11; 11-17-2008 by TOR-2008-4]

§ 180-75. Purpose. [Amended 11-7-2012 by TOR-2012-3]

The purpose of this section is to provide for the reasonable regulation and control of the erection and maintenance of signs and advertising devices within the Town, to the end that the appearance and amenities of the Town may be preserved and enhanced without unduly restricting the conduct of lawful enterprise.

§ 180-76. Administration and enforcement; violations and penalties.

A. Enforcement. The Inspector of Buildings or his designee is hereby authorized to enforce this article. The Inspector of Buildings or his designee shall keep a current list of permitted signs as a public record. Annually, prior to April 15, the Inspector of Buildings or his designee shall submit to the Outdoor Advertising Board a list of any billboards which do not meet the specifications of this authority, together with a notation as to wherein each sign does not comply. The Inspector of Buildings or his designee is authorized to order the repair or removal of any sign and its supporting structure which in his judgment is dangerous or in disrepair or which is erected or maintained contrary to this article. Whenever there is a change in the position of Inspector of Buildings, the new person shall send his or her name and address to the Outdoor Advertising Board.

B. Permits and fees.

(1) Except as provided in § 180-78, no sign shall be erected, altered or affixed to any building or placed on any premises until a permit has been issued by the Inspector of Buildings or his designee. Such permit shall be issued only if the sign complies or will comply with all applicable provisions of this article. An application for a sign permit under this article shall include an accurate sketch or a photograph showing the true dimensions of the face and frame of the sign, the lettering, wording, designs and symbols on the face and as attached to any part of the frame, the location of the sign and such plans, drawings and specifications as the Inspector of Buildings or his designee may require for the structure.

(2) A schedule of fees for such permits shall be determined from time to time by the Town Council.

C. Whoever violates any provisions of this article or any lawful order of the Inspector of Buildings or his designee shall be subject to enforcement and fines as set forth in §§ 180-15, 180-16 and 180-16.1. Each day that such violation continues shall constitute a separate offense. In addition, the Inspector of Buildings or his designee shall have the authority to remove any sign from municipal or public property with 24 hours' advance verbal notice to the owner of the sign. If the owner of the sign cannot be reasonably determined, the Inspector of Buildings or his designee may consider the sign abandoned and may remove the sign forthwith.

§ 180-77. General specifications.

A. Energy shortages. In the event of any energy shortage, the Council is authorized in its discretion to order that all signs in the Town consuming electric, gas, oil or other forms of energy cease such consumption in whole or in part during such hours and for such period as the Council designates. Nonconformance with the Council's order would be sufficient evidence for the Inspector of Buildings or his designee to revoke the permit for said sign. Forty-eigh hours' notice shall be given to the owner of such sign prior to any action taken by the Inspector of Buildings or his designee.

B. Illumination. Except as otherwise prohibited herein, signs may be illuminated by any fixed light source, of such nature and in such manner that the brightness of the sign face does not exceed 100 lumens per square foot. Except for neon-type signs, where permitted, such illumination shall be so arranged that its source is not directly visible from any way or occupied building, and no illumination shall be of any color that might be confusing to traffic. Christmas lights shall not be deemed as coming within the provisions of this subsection, but this subsection shall apply to window signs.

C. Placement of signs. The Inspector of Buildings or his designee may impose reasonable stipulations concerning placement based upon the speed of travel and sight distance of the adjacent ways, the number and location of signs already existing in the area and the concept of the sign in relation to the purpose of this article.

§ 180-78. Residence districts.

In any area zoned as a residence district, the following are authorized by right without a permit:

A. One sign displaying the street number and/or name of the occupant of the premises, not exceeding two square feet in area. Such signs may include identification of any accessory professional office or other accessory use permitted in a residence district. Of the signs allowed under Subsections A, D, E and H, the total number of signs per lot shall not exceed two.

B. Real estate signs pertaining to the lease, sale or use of a lot or building, provided that such signs do not exceed a total of six square feet of area. Such signs shall be removed forthwith upon sale or rental of the premises advertised.

C. One bulletin or announcement board, identification sign or entrance marker for each public entrance to the premises upon which a church, synagogue or educational institution or a governmental authority is located. Such signs shall not exceed 20 square feet in area, provided that there shall be no more than three signs for each church, synagogue or institutional building complex.

D. Attached signs. A sign otherwise permitted in this section may be attached to a building if it complies with all requirements of § 180-77 and this section.

E. Signs offering accommodations for guests, not to exceed two square feet in area.

F. Signs prohibiting trespass, hunting and the like, not to exceed two square feet in area.

G. Street name signs and signs erected by the Town, county or state for the direction and control of traffic.

H. Window signs. For residential zones and their accessory use, window signs, as defined herein, provided that the aggregate area of such signs shall not exceed two square feet in

area. The total of all such signs shall not exceed two square feet for each occupancy or establishment.

I. A sign on or adjacent to the entry of a multiple-occupancy building listing the names and/or occupations of the occupants or establishments therein, provided that the size of such sign shall not exceed two square feet in area for each occupancy or establishment.

J. Signs designating historical places or points of interest, erected by a governmental authority or by a duly chartered historical association or the like, not to exceed six square feet in area.

§ 180-79. Business and industrial districts.

In an area zoned as a business or industrial district, each place of business may be issued a permit for a sign or signs as follows:

A. Wall signs not to exceed 25% of the area of the front and rear walls and 10% of each secondary side of a building are permitted.

B. Standing signs are permitted, subject to the following conditions:

(1) Standing signs are not to exceed 25% of the front wall of the principal structure fronting on a street.

(2) Standing signs and V-shaped signs on roofs, marquees, cornices, awnings and projections are permitted. Signs mounted upon or part of ventilating equipment, shafts or towers projecting above the roofline of the building are prohibited.

(3) Signs located within the setback area shall not be located within 10 feet of grade, without advance written permission of the Inspector of Buildings or his designee, not including instructional signs.

(4) Window signs for permitted retail establishments in all districts. Window signs shall not exceed 50% of the area of the window glass.

§ 180-80. Agricultural districts.

In agricultural districts, a permit for two signs, not to exceed 32 square feet per sign in area, may be granted to identify an accessory use permitted. When the agricultural zone does not abut a street, the signs allowed under this section may be located on streetfront property contiguous to the agriculturally zoned land, provided that the land is under the same ownership. The sign shall conform to § 180-77 of this article. V-shaped signs or back signs are allowed. Freestanding signs shall be a minimum of 100 feet apart.

§ 180-81. Existing signs.

Any signs, except billboards, in existence at the time of the initial adoption of this article on September 12, 1977, shall not be subject to the provisions hereof except as to any provisions dealing with the structural integrity of the sign and § 180-85.

§ 180-82. Nonaccessory signs.

A. The erection or continued maintenance of private nonaccessory signs is not permitted.

B. The Town Council may authorize the erection of nonaccessory signs, kiosks or directories on public property for direction purposes. Following a public hearing, the Council shall stipulate specifications, conditions, locations and fees for the erection, use and maintenance of each nonaccessory sign, kiosk or directory. The Council may set the number of signs, kiosks or directories and the location thereof, but in no event shall the number of signs, kiosks or directories exceed six in number for any one entity, business, corporation or address.

C. Indemnification and liability.

(1) The applicant-owner authorized by the Town Council to erect and/or retain a nonaccessory sign, kiosk or directory on public property of the Town of Agawam as authorized under Subsections A and B of this section shall agree to save and hold harmless and indemnify the Town of Agawam, its officers, directors, employees, board members, elected and appointed officials and agents from and against all liability, claims, demands, damages, costs, expenses, attorney's fees, judgments, losses and all causes of action on account of personal injuries, property damage or loss, nuisance or damage of any kind and nature whatsoever, which arise out of or are in any manner connected with by reason of, pertaining to or relative to the authorization, erection, placement, construction, design, location, color, maintenance, repair, removal, destruction, vandalism, theft and accuracy of the signs, kiosks or directories under this section. The applicant-owner shall further agree to save and hold harmless and indemnify the Town of Agawam as aforesaid for any and all causes of action claimed to arise out of or which are in any manner connected with said signs, kiosks or directories, regardless of whether said injury, loss, damage, claim, costs, expenses, attorney's fees, judgments or losses shall have been caused by, or claimed to have been caused by, the negligence or fault of the Town of Agawam as aforesaid or the applicant-owner or by agents or employees of the foregoing or by accident or otherwise.

(2) In the event any action is brought against the Town of Agawam as aforesaid, the applicant-owner authorized under this section shall assume full responsibility and liability for the defense thereof, the costs, expenses, attorney's fees, settlements and judgments therefrom, and, upon the failure to do so on notice from the Town of Agawam, the Town of Agawam reserves the right to defend such action or actions and to charge all costs, expenses, attorney's fees, settlements and judgments thereto to the applicant-owner, and the applicant-owner shall immediately pay and reimburse the Town. The applicant-owner shall take all precautions necessary to protect the public against injury and damage.

(3) The applicant-owner shall be required to lawfully execute a hold-harmless indemnification agreement in compliance with this section prior to final authorization by the Town Council.

§ 180-83. Prohibitions.

A. Overhanging signs. No overhanging signs shall be permitted unless part of a cantilever of a principal building; however, this provision shall not apply to street name signs or to signs or devices erected by the Town, county or commonwealth for the direction and control of traffic.

B. Billboards as defined herein are prohibited.

C. Private signs on Town property are prohibited unless a permit for such a sign is authorized by the Town Council. No such authorization shall be given until after a duly advertised public hearing in accordance with § 180-82; any such signs shall conform in all respects to all other provisions of this article. Permits for such signs may be revoked at any time by the Town Council.

D. No signs shall contain, in the opinion of the Inspector of Buildings or his designee, a color or movement which is a violation of the purpose of this article.

§ 180-84. Temporary signs and political signs.

A. Temporary signs which do not comply with this article may be allowed only after issuance of a permit in accordance with § 180-76. Temporary signs which do not comply with this article may be authorized by the Inspector of Buildings or his designee for public or nonprofit purposes without fee. Temporary signs shall not exceed 12 square feet in area, and may be maintained for a period not exceeding 180 days for agricultural purposes and 60 days for any other purpose. The Inspector of Buildings or his designee shall have the sole discretion in the issuance or denial of permits for temporary signs. A property owner or business may receive only one permit for a temporary sign in any calendar year.

B. Political signs may be erected only on private property and with the landowner's permission. Political signs shall not exceed six square feet in area, may be erected 15 days prior to a primary election and maintained, in good condition, continuously until 48 hours after the close of the polls of the final election. Candidates eliminated in the primary election shall have their signs removed within 48 hours after the close of the polls of the primary election. All such signs shall be removed within the forty-eight-hour limit as a responsibility of the property owner. A challenge to the official count shall not negate this provision.

§ 180-85. Maintenance.

All signs, whether a permit is required or not, shall be maintained in a safe and legible condition to the satisfaction of the Inspector of Buildings or his designee. Failure to correct violation of this provision within 30 days after notice thereof shall constitute grounds for revocation of the permit, or for removal of the sign if it was erected without the need for a permit. It shall be a duty of the owner and/or the lessee of any sign to maintain the immediate premises occupied by the sign in a clean, sanitary and healthful condition.

§ 180-86. Special cases.

Notwithstanding the foregoing provisions of this article, certain special types of activities or situations are recognized for which such provisions may be modified and permits issued as follows:

A. Theaters. The marquee of a theater as defined in MGL c. 143 shall be considered as comprising part of the wall area in determining the total sign area to be permitted.

B. Subdivisions. One permanent subdivision name sign, not to exceed 32 square feet in area, may be permitted for each entry to a subdivision from a public way. Such a sign may be erected only upon receiving approval of the definitive plan for the project.

C. Contractors, developers. For each construction or development project, there may be issued a temporary permit for one standing sign, not to exceed 32 square feet in area, setting forth facts and names pertinent to the project. Such signs shall be erected only upon receiving approval by the Town for the project. Such signs shall be removed forthwith when the project is completed. Any project which is funded in whole or in part by federal, state or municipal funds may have such signs as the funding authority may require, regardless of the provisions of this article.

D. Gasoline stations. Standard pump head signs of gasoline filling stations shall not be included in the total area of signs permitted, and no permit shall be required therefor, but they shall conform to the provisions of § 180-77B of this article.

E. Where a building (or buildings in a common group such as a shopping center) contains three or more separate businesses (or professional offices) and it is desired to identify the building or group of buildings as such, in addition to the signs permitted for the individual businesses, there shall be permitted one standing sign displaying the name of the building or group of buildings and not to exceed 64 square feet plus 16 square feet for the listing of each occupant or business.

§ 180-87. Special permits.

The Board of Appeals is authorized to grant special permits for signs which would not otherwise comply with this article. In granting any such permit, the Board shall comply with all procedural requirements of law pertaining to the issuance of special permits in general.

§ 180-88. Severability.

The invalidity of any section or provision of this article for the regulation of signs shall not invalidate any other section or provision hereof.

§ 180-89. (Reserved)

ARTICLE XIV
Personal Wireless Service Facilities and Towers
[Added 3-2-1998 by TOR-97-13]

§ 180-90. Purposes.

The purposes of this article are to:

A. Preserve the character and appearance of the community while simultaneously allowing adequate personal wireless services to be developed;

B. Protect the scenic, historic, environmental and natural or man-made resources of the community;

C. Provide standards and requirements for the regulation, placement, construction,, monitoring, design, modification and removal of personal wireless service facilities and towers;

D. Provide a procedural basis for action within a reasonable period of time for requests for authorization to place, construct, operate or modify personal wireless service facilities and towers;

E. Preserve property values;

F. Locate towers so that they do not have negative impacts, such as, but not limited to, visual blight, attractive nuisance, noise and falling objects, on the general safety, welfare and quality of life of the community;

G. Require owners of personal wireless service facilities and towers to configure them so as to minimize and mitigate the adverse visual impact of the facilities and towers; and

H. Require the clustering and camouflaging of personal wireless service facilities and towers.

§ 180-91. Consistency with federal law.

This article is intended to be consistent with the Telecommunications Act of 1996, in that:

A. It does not prohibit or have the effect of prohibiting the provision of personal wireless services;

B. It is not intended to be used to unreasonably discriminate among providers of functionally equivalent personal wireless services; and

C. It does not regulate personal wireless services on the basis of the environmental effects of radio frequency emissions to the extent that the regulated services and facilities comply with the FCC's regulations concerning such emissions.

§ 180-92. Definitions. [Amended 11-7-2012 by TOR-2012-3]

For the purposes of this article, the following words and phrases shall have the meanings respectively ascribed to them by this section:

ACT — The Telecommunications Act of 1996.

§ 180-93. Exempted wireless telecommunications uses.

A. This article specifically exempts the following wireless telecommunications facilities:

(1) Police;

(2) Fire;

(3) Ambulance and other emergency dispatch;

(4) Citizens band radio; and

(5) Amateur radio equipment and towers used in accordance with the terms of any amateur radio service license issued by the FCC, provided that the tower is not used or licensed for any commercial purpose and the tower shall be removed upon loss or termination of said FCC license.

B. No personal wireless service facility shall be considered exempt from this article for any reason whether or not said facility is proposed to share a tower or other structure with such exempt uses.

§ 180-94. Wireless Telecommunications Overlay District (WTOD).

A. Purpose. The Wireless Telecommunications Overlay District (WTOD) is intended to protect the scenic, historic, natural and other resources of the Town of Agawam while allowing adequate personal wireless telecommunications to be developed. Towers shall be located only within Wireless Telecommunications Overlay District(s) within the Town of Agawam by special permit. Wireless telecommunications facilities mounted on top of an existing building (roof-mounted), mounted adjacent to the side or rear of an existing building (side-mounted) or mounted to the facade of an existing building (facade-mounted) may be located within these district(s), but are also allowed in the rest of the Town by special permit.

B. Description. This district includes the properties listed below. These properties are included by reason of their potential to provide technically feasible and accessible locations for the siting of facilities which can provide adequate personal wireless telecommunications services to the Town of Agawam. The Overlay District is defined, delineated and mapped on the map entitled "Wireless Telecommunications Overlay District Map, Town of Agawam MA," which is incorporated herein by reference.[13]

Property Name	Assessor's Map, Block and Lot
Bondi's Island	N15-1-1
	N14-1-1
Riverside Park	K3-3-1
Crestview Country Club	H3-1-21
	H3-1-24
	H3-1-19

13. **Editor's Note: A copy of said map is on file in the office of the Town Clerk and may be examined there during regular business hours.**

Property Name	Assessor's Map, Block and Lot
	H3-1-22
	G2-1-1
Oak Ridge Country Club	E2-1-6
St. Anne Golf Course	F6-1-1
Agawam Municipal Golf Course	D10-1-6
Adams TV of Springfield	B14-1-4
	B14-1-3
	B14-1-5
Agawam Regional Industrial Park	G7-1-3
	G7-1-4
	G7-2-6
	G6-1-1
	F6-2-2
	G7-3-1
	G6-3-6
	G7-1-8
	H7-2-4
	G6-1-7
	H7-2-3
	G6-1-3
	G7-2-2
	G6-1-8
	G6-1-4
	G5-6-1
	H7-2-2
	F7-2-2
	G5-6-2
	G5-6-3
	G6-3-4
	H8-1-1
	G7-2-3
	G6-3-5
	H8-1-1
	G8-1-14
	G7-1-1
	G7-1-2

Property Name	Assessor's Map, Block and Lot
	G7-2-1
Western Massachusetts Electric	H5-1-5
	H5-1-6
	H5-1-1
	H6-1-1
	H6-1-17
	H6-1-18
	I4-1-9
	I5-1-11
	I5-1-12

C. Relation to other districts. The WTOD is an overlay district mapped over other districts. It modifies and, where there is inconsistency, supersedes the regulations of such other districts. Except as so modified or superseded, the regulations of the underlying districts remain in effect.

D. Applicability. Any use of lands within the WTOD for purposes of placement, construction, modification or removal of personal wireless service facilities and/or towers shall be subject to the requirements of this article.

§ 180-95. Provision of independent consultants to review granting of special permit.

A. Upon submission of an application for any special permit under this article, the applicant shall pay a review fee determined by the SPGA, consisting of reasonable costs to be incurred by the SPGA for the employment of independent consultants. These consultants shall each be qualified professionals with a record of service to municipalities in one or more of the following:

(1) Telecommunications engineering;

(2) Structural engineering;

(3) Monitoring of electromagnetic fields; and

(4) (If determined necessary by the SPGA) other relevant fields of experience as determined by the SPGA.

B. The SPGA shall select the independent consultant(s) after consultation with the Board of Health and the Conservation Commission and the Department of Public Works, each of which shall propose a list of qualified candidates.

§ 180-95.1. Provision of independent consultants to evaluate zone change requests. [Added 11-5-2014 by TOR-2014-9; amended 3-16-2015 by TOR-2015-1]

A. Upon submission of an application for a zone change to add a parcel to the Wireless Telecommunications Overlay District under this article, the applicant shall pay a review fee determined by the City Council, consisting of reasonable costs to be incurred by the

City Council for the employment of independent consultants. These consultants shall each be qualified professionals with a record of service to municipalities in one or more of the following:

(1) Telecommunications engineering;

(2) Structural engineering;

(3) Monitoring of electromagnetic fields; and

(4) (If determined necessary by the City Council) other relevant fields of experience as determined by the City Council.

B. The independent consultant(s) shall assist the City Council in determining whether the subject parcel needs to be added to the Wireless Telecommunications Overlay District. Said analysis shall include, but not be limited to, determining whether adequate personal wireless services can be provided utilizing existing parcels in the Wireless Telecommunications Overlay District and/or existing structures, including but not limited to buildings, water towers, existing telecommunication facilities, utility poles and towers and related facilities, provided that such installation preserves the character and integrity of those structures.

§ 180-96. Application requirements.

No personal wireless service facility or tower shall be erected, constructed or installed or undergo Major Modification without first obtaining a special permit from the SPGA in accordance with the requirements set forth herein.

A. Adequate coverage, adequate capacity and justification of need for personal wireless service facility and/or tower.

(1) Sites in which applicant has legal or equitable interest.

(a) The applicant shall provide written documentation of any facility site(s) in Agawam and any sites in abutting towns located within eight miles of any boundary of the Town of Agawam in which it has any legal or equitable interest, whether by ownership, leasehold or otherwise. For each such facility site, it shall demonstrate with written documentation that this facility site is not already providing or does not have the potential by adjusting the site to provide adequate coverage and/or adequate capacity to the Town of Agawam. The documentation shall include, for each facility site listed:

[1] The exact tower location (in longitude and latitude, to degrees, minutes, seconds);

[2] Ground elevation above mean sea level at the tower location;

[3] Height of tower or structure;

[4] Type, manufacturer and model number of antennas;

[5] Antenna gain;

[6] Height of antennas on tower or structure;

[7] Output frequency;

[8] Number of channels;

[9] Power input; and

[10] Maximum power output per channel.

(b) Potential adjustments to these existing facility sites, including changes in antenna type, orientation, gain, height or power output shall be specified. Radial plots from each of these facility sites, as they exist, and with adjustments as above, shall be provided as part of the application.

(2) Sites in which applicant has no legal or equitable interest.

(a) The applicant shall demonstrate with written documentation that it has examined all existing facility sites located in Agawam and any sites in abutting towns located within eight miles of any boundary of the Town of Agawam in which the applicant has no legal or equitable interest, whether by ownership, leasehold or otherwise, to determine whether the existing facility sites can be used to provide adequate coverage and/or adequate capacity to the Town of Agawam. The documentation shall include, for each existing facility site examined:

[1] The exact tower location (in longitude and latitude, to degrees, minutes, seconds);

[2] Ground elevation above mean sea level at the tower location;

[3] Height of tower or structure;

[4] Type, manufacturer and model number of proposed antennas;

[5] Proposed antenna gain;

[6] Height of proposed antennas on tower or structure;

[7] Proposed output frequency;

[8] Proposed number of channels;

[9] Proposed power input; and

[10] Proposed maximum power output per channel.

(b) Radial plots from each of these existing facility sites, configured as documented above, shall be provided as part of the application.

(3) The applicant shall demonstrate with written documentation that it has analyzed the feasibility of repeaters in conjunction with all existing facility sites listed in compliance with the sections above to provide adequate coverage and/or adequate capacity to the Town of Agawam. Radial plots of all repeaters considered for use in conjunction with these facility sites shall be provided as part of the application.

B. Required documentation for personal wireless service facility and/or tower. The applicant shall include reports prepared by one or more professional engineers, which shall

demonstrate that the personal wireless service facility and tower comply with all applicable standards of the federal and state governments, more specifically:

(1) Copies of ail submittals and showings pertaining to: FCC licensing, environmental impact statements, FAA notice of construction or alteration, aeronautical studies and all data, assumptions and calculations relating to service coverage and power levels regardless of whether categorical exemption from routine environmental evaluation under the FCC rules is claimed.

(2) Copies of all information submitted in compliance with requirements of Massachusetts Department of Public Health, 105 CMR 122 Fixed Facilities Which Generate Electromagnetic Fields in the Frequency Range of 300 khz to 100 ghz and Microwave Ovens, or any revisions thereof as the Department of Public Health may, by written notice, create.

(3) The exact legal name, address or principal place of business and phone number of the applicant. If any applicant is not a natural person, it shall also give the state under which it was created or organized.

(4) The name, title, address and phone number of the person to whom correspondence or communications in regard to the application are to be sent. Notice, orders and other papers may be served upon the person so named, and such service shall be deemed to be service upon the applicant.

(5) Name, address, phone number and written consent to apply for this permit of the owner of the property on which the proposed personal wireless service facility and/ or tower shall be located or of the owner(s) of the tower or structure on which the proposed personal wireless service facility shall be located.

(6) Required plans and engineering plans, prepared, stamped and signed by a professional engineer licensed to practice in Massachusetts. (Note: Survey plans shall also be stamped and signed by a professional land surveyor registered in Massachusetts.) Plans shall be on sheets 24 inches x 36 inches, on as many sheets as necessary and at scales which are no smaller (i.e., no less precise) than listed below. Each plan sheet shall have a title block indicating the project title, sheet title, sheet number, date, revision dates, scale(s) and original seal and signature of the professional engineer and other professionals who prepared the plan.

(7) The applicant shall, as part of its application, provide the SPGA with the following plans and maps:

(a) Proposed site plans.

[1] Proposed facility site layout, grading and utilities at a scale no smaller than one inch = 40 feet (1:480 or metric equivalent 1:500) showing the entire vicinity within a radius of 400 feet of the tower site, with topography drawn with minimum of contour intervals of two feet (0.6 meter).

[2] Proposed tower location and any appurtenances and accessory buildings (communication equipment shelter or other). Indicate property boundaries of the Overlay District and setback distances to the base(s) of the tower

and to the nearest comers of each of the appurtenant structures to those boundaries and dimensions of all proposed improvements.

[3] Limits of areas where vegetation is to be cleared or altered and justification for any such clearing or alteration.

[4] Plans of proposed access driveway or roadway and parking area at the facility site. Include grading, drainage, traveled width. Include a cross section of the access drive indicating the width, depth of gravel, paving or surface materials.

(b) Proposed tower and appurtenances.

[1] Plans, elevations, sections and details at appropriate scales but no smaller than one inch = 10 feet.

[2] Two cross-sections through proposed tower drawn at right angles to each other and showing the ground profile to at least 100 feet beyond the limit of clearing. Indicate proposed spot elevations at the base of the proposed tower. Dimension the proposed height of the tower above average grade at tower base. Indicate the maximum allowable structural height of the tower after addition of any modular sections. Show all proposed antennas, including their location on the tower.

[3] Details of typical tower foundation, including cross sections and details. Show all ground attachments, specifications for anchor bolts and other anchoring hardware.

[4] Detail proposed exterior finish and camouflage of the tower.

[5] Indicate relative height of the tower to the tops of surrounding trees as they presently exist.

(c) Proposed communications equipment shelters.

[1] Floor plans, elevations and cross sections at a scale of no smaller than 1/4 inch = one foot (1:48) of any proposed appurtenant structure.

[2] Representative elevation views, indicating the roof, facades, doors and other exterior appearance and materials.

(d) Proposed equipment plan.

[1] Plans, elevations, sections and details at appropriate scales, but no smaller than one inch = ten feet.

[2] Number of antennas and repeaters (if any), as well as the exact locations of all repeaters (if any) located on a map, as well as by degrees, minutes and seconds of latitude and longitude.

[3] Mounting locations on tower or structure, including height above ground.

[4] Antenna type(s), manufacturer(s), model and number(s).

[5] For each antenna, the antenna gain and antenna radiation pattern.

[6] Number of channels per antenna, projected and maximum.

[7] Power input to the antenna(s).

[8] Power output, in normal use and at maximum output for each antenna and all antennas as an aggregate.

[9] Output frequency of the transmitter(s).

C. Application requirements for roof-mounted, side-mounted and facade-mounted personal wireless service facilities. The use of repeaters to assure adequate coverage or to fill holes within areas of otherwise adequate coverage, while minimizing the number of required towers is permitted and encouraged.

(1) Applicants shall provide the following information:

(a) The exact location (in longitude and latitude, to degrees, minutes and seconds), as well as by street address or pole number (if applicable);

(b) Ground elevation;

(c) Proposed output frequency;

(d) Proposed number of channels;

(e) Proposed power input; and

(f) Proposed maximum power output per channel.

(2) Name, address, phone number and written consent to apply for this permit of the owner of the property on which the proposed facility shall be located.

(3) Proposed site layout, grading and utilities at a scale no smaller than one inch = 40 feet (1:480 or metric equivalent 1:500) showing the entire vicinity within a radius of 300 feet of the site with topography drawn with minimum contour intervals of two feet (0.6 meter).

(a) Proposed facility location and any appurtenances, if any, and any accessory building (communication equipment shelter or other). Indicate property boundaries of abutters within 300 feet of the facility, and dimensions of all proposed improvements;

(b) Limits of areas where vegetation is to be cleared or altered and justification for any such clearing or alteration; and

(c) Plans of any proposed access driveway or roadway and parking area at the site. Include grading, drainage, traveled width. Include a cross section of the access drive indicating the width, depth of gravel, paving or surface materials.

§ 180-97. General requirements.

A. If feasible, personal wireless service facilities shall be located on existing structures, including, but not limited to, buildings, water towers, existing telecommunication facilities, utility poles and towers and related facilities, provided that such installation preserves the character and integrity of those structures.

B. Only freestanding monopoles, with associated antenna and/or panels, shall be allowed as specified in this section. Lattice-style towers and facilities requiring guy wires and/or three or more legs for support are prohibited.

C. If the applicant demonstrates that it is not feasible to locate on an existing structure, personal wireless services facility shall be designed so as to be camouflaged to the greatest extent possible, including, but not limited to: use of compatible building materials and colors, screening, landscaping and placement within trees. One week prior to and one week following the public hearing, a balloon shall be put in place at the height of the proposed tower. The balloon shall be of a size and color that can be seen from every direction for a distance of one mile.

D. A special permit shall not be granted for a tower to be built on speculation. If the applicant is not simultaneously installing a personal wireless service facility on the tower, it shall provide a copy of its existing lease/contract with a personal wireless service provider. Said provider shall provide all necessary data to comply with the terms of this article, as part of the applicant's application for a personal wireless service facility and/or tower or the special permit shall not be granted.

E. Tower(s) shall minimize, to the extent feasible, adverse visual impacts on the environment. The SPGA may impose reasonable conditions to ensure this result, including, but not limited to, requiring the use of camouflage, painting, lighting standards and screening.

F. When a personal wireless service facility extends above the roof height of a building on which it is mounted, every effort shall be made to conceal the facility within or behind existing architectural features to limit its visibility from public ways. Facilities mounted on a roof shall be stepped back from the front facade in order to limit their impact on the buildings silhouette. Personal wireless service facilities which are side mounted shall blend with the existing building's architecture and, if over five square feet, shall be painted or shielded with material which is consistent with the design features and materials of the building.

G. A vegetated buffer strip of undisturbed trees of an adequate depth to screen the facility and no less than 20 feet shall be retained as close to the tower as possible.

H. The tower and communication equipment shelter(s) shall be completely fenced for security within a gated area no greater than 10,000 square feet, with fence height limited to six feet. Use of razor wire is not permitted. **[Amended 3-18-2002 by TOR-2001-7]**

I. There shall be no signs, except the following: a sign no greater than two square feet indicating the name of the personal wireless service facility's owner(s), and a twenty-four-hour emergency telephone number shall be posted adjacent to the entry gate. In addition, No Trespassing or other warning signs may be posted on the fence. All signs shall conform to the sign requirements of this chapter.

J. New towers shall be the lesser of 190 feet; or the minimum height determined by the independent consultant(s) to provide the applicant adequate coverage from the personal wireless service facility(s) proposed for use on the tower. Side- and roof-mounted personal wireless service facilities shall not project more than 10 feet above the height of an existing building nor project more than 10 feet above the height limit of the zoning district within which the facility is located. Personal wireless service facilities may be located on a building that is legally nonconforming with respect to height, provided that the facilities

do not project above the existing building height. New antennas located on any of the following structures existing on the effective date of this article shall be exempt from the height restrictions of this article, provided that there is no increase in height of the existing structure as a result of the installation of a personal wireless service facility: water towers, guyed towers, lattice towers, fire towers and monopoles. New antennas located on any of the following existing structures shall be exempt from the height restriction of the article, provided that there is no more than a twenty-foot increase in the height of the existing structure as a result of the installation of a personal wireless service facility: electric transmission and distribution towers, telephone poles and similar existing utility structures.

K. In order to ensure public safety, the minimum distance from the base of a telecommunications tower to any property line and/or street, and all buildings on the subject property occupied on a regular basis, shall be a minimum of 260 feet; or 1 1/2 times the height of the facility/mount, including any antennas or appurtenances, whichever is greater. Such minimum distance to all publicly owned parks and playgrounds shall be at least 375 feet. As used herein, "publicly owned parks" shall not include any golf courses. **[Amended 3-18-2002 by TOR-2001-7]**

L. To the extent feasible, all network interconnections to and from the telecommunications site and all power to the site shall be installed underground. At the initial construction of the access road to the site, sufficient conduit shall be laid to accommodate the maximum possible number of personal wireless service providers licensed to provide services to the Town of Agawam and surrounding areas.

M. Unless required by the Federal Aviation Administration, no night lighting of towers, or the personal wireless service facility is permitted, except for manually operated emergency lights for use only when operating personnel are on site.

N. No tower or personal wireless service facility, with the exception of roof-mounted, side-mounted, facade-mounted or structure-mounted telecommunications facilities or repeaters, shall be located outside of the Wireless Telecommunications Overlay District(s). No tower or personal wireless service facility shall be located within any of the following prohibited areas:

(1) Massachusetts or federally-regulated wetland.

(2) Massachusetts certified vernal pool.

O. A different existing structure or use on the same lot shall not preclude the construction and installation of a wireless telecommunications facility on such lot. If a tower and its equipment buildings are the sole use of the lot, the tower shall be deemed to be the principal use; otherwise, the use shall be considered accessory. **[Added 3-18-2002 by TOR-2001-7]**

§ 180-98. Evaluation by independent consultants.

A. Upon submission of a complete application for any special permit(s) under this article, the SPGA shall provide its independent consultant(s) with the full application(s) for their analysis and review.

B. Applicants for any special permit(s) under this article shall grant permission for the town's independent consultant(s) to conduct any necessary site visit(s).

§ 180-99. Approval criteria.

A. In acting on any special permit application, the SPGA shall proceed in accordance with the procedures and timelines established for special permits in this chapter. The special permit granting authority may adopt and from time to time amend rules and regulations relative to the issuance of such permits and shall file a copy of said rules and regulations in the office of the Town Clerk.

B. In addition to the findings required in this article, the SPGA shall, in consultation with the independent consultant(s), make all of the applicable findings before granting the special permit, as follows:

(1) That the applicant is proposing to locate its personal wireless service facility or tower within a Wireless Telecommunications Overlay District or other districts as provided by this article;

(2) That the applicant is not able to use existing towers/facility sites in or around the Town of Agawam, either with or without the use of repeaters, to provide adequate coverage and/or adequate capacity to the Town of Agawam;

(3) That the proposed personal wireless service facility/tower will not have an undue adverse impact on historic resources, scenic views, residential property values, natural or man-made resources;

(4) That the applicant has agreed to implement all reasonable measures to mitigate the potential adverse impacts of the towers and facilities; and

(5) That the proposal shall comply with FCC 96-326 and any and all other applicable FCC regulations regarding emissions of electromagnetic radiation and that the required monitoring program is in place and shall be paid for by the applicant.

(6) Any decision by the SPGA to deny an application for a special permit under this article shall be in conformance with SEC. 332(47 U.S.C. § 332) J(7)(B)(ii), (iii) of the Act, in that it shall be in writing and supported by substantial evidence contained in a written record.

§ 180-100. Removal requirements.

A. Any personal wireless service facility (ground-mounted or otherwise) which ceases to operate for a period of one year shall be removed. "Cease to operate" is defined as not performing the normal functions associated with the personal wireless service facility and its equipment on a continuous and ongoing basis for a period of one year. At the time of removal, the facility site shall be remediated such that all personal wireless service facility improvements which have ceased to operate are removed. If all facilities on a tower have ceased to operate, the tower shall also be removed, and the facility or repeater site, including any access road(s) which lead to that facility site from the main access road, shag be revegetated. If all facility sites have ceased to operate, the owner of the last personal wireless service facility to leave the site shall revegetate the access road in its entirety. Existing trees shall only be removed with the written permission of the SPGA and only if the SPGA determines such removal of trees to be necessary to complete the required removal of personal wireless service facility(s).

B. Removal performance guaranty. The applicant shall, as a condition of the special permit, post an initial cash bond in a reasonable amount determined and approved by the SPGA. This bond shall be in force to cover the costs of the remediation of any damage to the landscape which occurs during the clearing of the site and to cover the cost of the removal of the tower or facility from the site and remediation of the landscape, should the facility cease to operate.

§ 180-101. Fees and insurance.

Towers and personal wireless service facilities shall be insured by the owner(s) against damage to persons or property. The owner(s) shall provide a certificate of insurance to the Planning Board on an annual basis. For towers and facilities located on property owned by the Town of Agawam, the Town of Agawam shall be an additional named insured.

§ 180-102. Noncompliance; violations; enforcement; attorney's fees.

Upon determination that the applicant and/or owner has failed to comply with this article or is in violation of this article, and the Town of Agawam takes any action to enforce this article, bring the applicant and/or owner into compliance with this article, or to abate any violations under this article, the applicant and/or owner shall be liable and responsible to pay to the Town of Agawam all costs, expenses and reasonable attorney's fees for such action taken by the Town of Agawam. Failure to pay said costs, expenses and reasonable attorney's fees within 30 days of receipt of notice to pay the same shall be grounds for the revocation of any special permit issued in accordance with this article.

§ 180-103. Severability.

The invalidity of any section or provision of this article shall not invalidate any other section or provision hereof or to take any other action with respect thereto.

ARTICLE XV
Adult Entertainment Businesses
[Added 8-3-1998 by TOR-98-4]

§ 180-104. Statutory authority.

This article is enacted pursuant to MGL c. 40A, and pursuant to the Town of Agawam's authority under the Home Rule Amendment to the Massachusetts Constitution to serve the compelling Town interests of limiting the location of and preventing the clustering and concentration of certain adult entertainment uses, as defined and designated herein, in response to studies demonstrating their deleterious effects.

§ 180-105. Purpose.

It is the purpose of this adult entertainment article to address and mitigate the secondary effects of the adult entertainment establishments and sexually oriented businesses that are referenced and defined herein. Secondary effects have been shown to include increased crime, adverse impacts on public health, adverse impacts on the business climate of the Town of Agawam, adverse impacts on the property values of residential and commercial properties and adverse impacts on the quality of life in the town. All of said secondary impacts are adverse to the health, safety and general welfare of the Town of Agawam and its inhabitants. The provisions of this article have neither the purpose nor intent of imposing a limitation on the content of any communicative matter or materials, including sexually oriented matter or materials. Similarly, it is not the purpose or intent of this article to restrict or deny access by adults to adult entertainment establishments or to sexually oriented matter or materials that are protected by the Constitutions of the United States or of the Commonwealth of Massachusetts, nor to restrict or deny rights that distributors or exhibitors of such matter or materials may have to sell, rent, distribute or exhibit such matter or materials. Neither is it the purpose or intent of this article to legalize the sale, rental, distribution or exhibition of obscene or other illegal matter or materials.

§ 180-106. Definitions.

As used in this article, the following terms shall have the meanings indicated:

ADULT ENTERTAINMENT USES — Include the following uses:

A. Adult bookstores, as defined in MGL c. 40A, § 9A.

B. Adult motion-picture theaters, as defined by MGL c. 40A, § 9A.

C. Adult paraphernalia store, as defined by MGL c. 40A, § 9A.

D. Adult video store, as defined by MGL c. 40A, § 9A.

E. Establishment which displays live nudity for its patrons, as defined by MGL c. 40A, § 9A.

§ 180-107. Special permit required; criteria.

Adult entertainment uses shall be prohibited in all zoning districts except as otherwise permitted in this article and may be permitted only upon the grant of a special permit by the Board of Appeals. An adult entertainment use special permit shall not be granted unless each of the following standards has been met.

A. The application for a special permit for an adult entertainment use shall provide the name and address of the legal owner of the establishment, the legal owner of the property and the manager of the proposed establishment. The owners and managers shall be considered coapplicants.

B. No adult use special permit shall be issued to any person convicted of violating the provisions of MGL c. 119, § 63, or MGL c. 272, § 28.

C. Location.

(1) Adult entertainment uses shall not be located within:

(a) One thousand five hundred feet from any district designated by the Agawam Zoning Ordinance for residential use; or

(b) One thousand five hundred feet from the nearest church, school, park, playground, play field, youth center; or

(c) One thousand five hundred feet from the nearest adult entertainment use as defined herein; or

(d) One thousand five hundred feet from the nearest establishment licensed under MGL c. 138, § 12.

(2) The distances specified above shall be measured by a straight line from the nearest property line of the premises on which the proposed adult entertainment use is to be located to the nearest boundary line of a residential zoning district or to the nearest property line of any of the other designated uses set forth above.

D. All building openings, entries and windows shall be screened in such a manner as to prevent visual access to the interior of the establishment by the public. In no way shall such screening prevent public safety personnel from entering the premises at any time without the use of special tools or equipment.

E. No adult entertainment use shall be allowed to display for advertisement or other purpose any signs, placards or other like materials to the general public on the exterior of the building or on the interior where the same may be seen through glass or other like transparent material any sexually explicit figures or words as defined in MGL c. 272, § 31.

F. No adult entertainment use shall be allowed to disseminate or offer to disseminate adult matter or paraphernalia to minors or suffer minors to view displays or linger on the premises or enter into the premises.

G. Off-street parking shall be provided in compliance with Town regulations and shall be designated so as not to obstruct police patrol views of the premises.

H. No adult entertainment use shall have any flashing lights or neon or other fluorescent lights visible from outside the establishment.

I. No adult entertainment use shall have a freestanding accessory sign.

J. No adult entertainment use shall be established prior to submission and approval of a site plan by the Board of Appeals. The site plan shall depict all existing and proposed buildings, parking spaces, driveways, service areas and other open uses. The site plan shall show the

distances between the proposed adult entertainment use and the boundary of the nearest residential zoning district and the property line of each use of the use set forth in Subsection C above.

K. The owners and managers of an establishment granted an adult entertainment use special permit shall not permit any obscene matter, material or conduct, as defined in MGL c. 272, § 31, on the premises.

L. Special permits issued by the special permit granting authority shall require the unanimous vote of the three members of the special permit granting authority. If the special permit granting authority has more than three members, the vote shall be as provided for in MGL c. 40A.

§ 180-108. Conditions.

The special permit granting authority may impose reasonable conditions, safeguards and limitations on time or use of any special permit granted and shall require that any such special permit granted shall be personal to the applicant, shall not run with land and shall expire upon expiration of the applicant's lease or upon sale or transfer of the subject property.

§ 180-109. Suspension and revocation of special permit.

The special permit granting authority may suspend or revoke a special permit granted hereunder for any violation of the special permit, for any violation of the Town of Agawam ordinances and/or for any violation of state or federal law.

§ 180-110. Expiration of special permit.

A special permit to conduct an adult entertainment use shall expire after a period of one calendar year from its date of issuance and shall automatically be renewable for a successive one-year period thereafter, provided that a written request for such renewal is made to the special permit granting authority prior to said expiration and that no objection to said renewal is made and sustained by the special permit granting authority based upon the public safety factors applied at the time that the original special permit was granted.

§ 180-111. Severability.

The provisions of this article are severable, and, in the event that any provision of this article is determined to be invalid for any reason, the remaining provisions shall remain in full force and effect.

ARTICLE XVI

Open Space Residential Development; Age-Restricted Housing; Low-Density Multifamily Community District

[Added 12-4-2006 by TOR-2006-9]

§ 180-112. Open space residential development.

Commented [CM11]: In FY22, PVPC will be working with a roundtable of Pioneer Valley communities to develop a model flexible/open space/cluster development ordinance, with options appropriate to rural and urban communities. I made some basic comments here, but make sure to stay abreast of that project.

A. Intent. Open space residential development (OSRD) in accordance with this article shall be allowed by right in the Residence A-1, Residence A-2, and Agricultural Districts. "Open space residential development" shall mean a residential development adjacent to permanently preserved open space. Open space residential development shall be encouraged within the Town, and shall be the preferred method of subdivision development wherever the following purposes would be served.

B. Purposes. The purposes of open space residential development are:

(1) To allow for greater flexibility and creativity in the design of residential developments, provided that the overall density of the development is no greater than what is normally allowed in the district.

(2) To encourage the permanent preservation of open space, agricultural lands, forest lands and other natural resources, including aquifers, water bodies and wetlands, and historical and archaeological resources.

(3) To encourage a less sprawling and more efficient form of development that consumes less open land and conforms to existing topography and natural features.

(4) To maintain the traditional New England rural character and land use pattern in which small villages contrast with open space and farmlands.

(5) To facilitate the construction of streets, utilities and public services in a more economical and efficient manner.

(6) To ensure that residential developments respect the natural features of the land, including wetlands, watercourses, forests, prime agricultural land, steep slopes, plants, wildlife, historic sites, scenic views, and rural character.

(7) To promote alternatives to strip residential development lining roadsides in the Town.

(8) To provide wildlife corridors connecting open spaces needed by wildlife to ensure their survival.

C. Applicability.

(1) Five-acre minimum. In any residential development consisting of five contiguous acres or more and 100 feet of frontage in single or consolidated ownership, an applicant may apply for an OSRD under this article.

(2) Uses permitted. The permitted uses of the underlying district(s) shall continue to be in full force and effect.

(3) Special land features. The Planning Board may recommend that an applicant use an OSRD subdivision design if the property possesses one or more of the following special features:

(a) Unfragmented open land as identified as a priority for protection in the Town's Open Space and Recreation Plan, Master Plan or the Community Development Plan.

(b) Agricultural land with soils designated as prime or of statewide significance by the U.S. Natural Resource Conservation Service soil surveys.

(c) Rare, threatened, or endangered species or exemplary natural communities according to the Massachusetts BioMap Project developed by the Massachusetts Natural Heritage and Endangered Species Program.

(d) Unique natural, cultural and/or historical features as identified in the Master Plan or Community Development Plan.

D. Application requirements. Applicants for open space residential development projects shall follow all procedures specified in the Town of Agawam Subdivision Rules and Regulations.[14]

E. Design standards. No approval for an OSRD shall be given unless the application complies with the following standards:

(1) The compatibility of the proposal with respect to the objectives and policy recommendations of the Open Space and Recreation Plan and Community Development Plan or Master Plan.

(2) Consistency with the Town of Agawam's Zoning Ordinance.

(3) The portion of a parcel placed in open space shall, to the greatest extent possible, be that which is most valuable or productive as a natural resource, wildlife habitat, farmland, or forestry land.

(4) Streets shall be designed and located in such a manner as to maintain and preserve natural topography, significant landmarks and trees; to minimize cut and fill; and to preserve and enhance views and vistas on or off the subject parcel.

F. Dimensional standards.

(1) Allowed density.

(a) The maximum number of dwelling units for an OSRD shall be determined by use of a yield plan, which is a conceptual plan showing how the parcel could be subdivided in a conventional manner. Determination of the possible number of conventional lots shall be determined by Title V regulations, 310 CMR 15.000, as well as the Agawam Board of Health regulations. For purposes of determining the number of OSRD dwelling units, each conceptual conventional lot must meet the requirements of a buildable lot for a single-family dwelling unit on one acre of land. In no case shall the number of OSRD dwelling

14. Editor's Note: See Ch. 159, Subdivision of Land.

units exceed the number of units that would be allowed under a conventional subdivision.

(b) There shall be no further subdivision of an approved OSRD.

(2) Flexible dimensional controls.

(a) Frontage.

[1] The minimum frontage for a tract on which an OSRD is proposed shall be a contiguous 100 feet and provide safe access for a right-of-way of at least 46 feet.

[2] In the interest of flexibility and creative site designs, there shall be a minimum frontage requirement of 60 contiguous feet for individual lots on new subdivision streets within an OSRD, with the exception described in Subsection F(2)(a)[3] below.

[3] For each lot developed along a public street existing at the time of the application, the minimum frontage, minimum lot size and all other dimensional controls shall be those which are-required in the underlying zoning district in which the OSRD is located.

(b) Lot size. The minimum lot size for all lots in the open space residential development is one acre.

(c) Setbacks.

[1] There shall be a minimum setback of 50 feet along all property boundaries of the overall tract for all structures, including accessory structures, parking areas, driveways and internal streets. Entrance streets connecting the OSRD to the external street system may cross the setback area.

[2] Minimum front, side, and rear yard setbacks shall be the same as normally required in the district.

(d) Required open space. The minimum open space requirement for an OSRD within the Residence A-1 and Agricultural Districts shall be 50% of the total tract area. The minimum open space requirement for an OSRD within the Residence A-2 District shall be 35% of the total tract area.

(3) Landscaped buffers.

(a) A landscaped buffer no less than 30 feet deep shall be provided. Entrance streets connecting the OSRD to the external street system may cross the buffer area. The natural vegetation shall be retained within the buffer area. If the natural vegetation is not sufficient to serve as an effective visual screen, landscaping shall be required to provide such a screen. Landscaping may include berms and/or decorative fencing of an appropriate height. The Planning Board may waive this requirement in instances that it deems appropriate.

(b) This buffer area shall be part of the open space and shall be subject to the same restrictions that apply to that area.

G. Common open space.

(1) Common open space requirements.

(a) Within the Residence A-1 and Agricultural Districts, a minimum of 50% of the total development parcel must be permanently protected as common open space. Within the Residence A-2 District, a minimum of 35% of the total development parcel must be permanently protected as common open space. At least 70% of the common open space shall be retained in contiguous areas, unless approved by the Planning Board.

(b) Watercourses, lakes, ponds, wetlands and steep slopes over 25% may be included in common open space calculations, but shall not exceed 50% of the required open space.

(c) The Planning Board may permit up to 3% of the open space area to be paved or built upon for structures accessory to the dedicated use of open space (i.e., pedestrian walks, bicycle paths, playgrounds, farm-related structures).

(d) All recreational facilities, common areas, and common open space shall be reasonably accessible to all residents of the development.

(2) Land protection methods for common open space.

(a) All land not devoted to buildings, lots, roads and other development shall be permanently protected as common open space for recreation, conservation, forestry or agricultural uses which preserve the land in its natural condition.

(b) The land shall be owned by a nonprofit land trust or conservation organization, homeowners' association, or individual, and a permanent deed restriction must be conveyed to the Town, with Town approval, or to a nonprofit trust or conservation organization whose principal purpose is to conserve farmland or open space. The Town shall review and approve all language contained in the deed restriction prior to final approval of the open space residential development. The deed restriction shall run with the land in perpetuity.

(c) Further subdivision of common open land or its use other than recreation, conservation, forest or agriculture, except for easements for underground utilities or drinking water supply wells, shall be prohibited.

H. Additional requirements.

(1) Trails. Where there is an existing local or regional trail network on land adjacent to a proposed OSRD, the developer of the OSRD may be required to connect to the existing trail network with trail corridors through the site, and shall grant the general public access to these trails in perpetuity. The trails shall be restricted to pedestrian access.

(2) Open space. Where there is an existing network of open space or large tracts of unfragmented open space on land adjacent to a proposed OSRD, the developer of the OSRD may be required to connect to the existing open space where feasible with the required open space set-aside, and shall grant the general public access to this open space in perpetuity. Public access shall be restricted to pedestrian traffic.

(3) Forest management. On sites where the open space to be preserved is mostly mature forest (70% or greater), the developer of an OSRD may be required to submit a forest management plan developed by a Massachusetts licensed forester and approved by the Planning Board.

(4) Viewshed and viewpoints. The development may protect in perpetuity viewsheds and associated viewpoints, which are lands or corridors of land that contribute to the visual landscape of the Town, including items such as open fields containing stone walls. The Planning Board may make use of a site visit to determine potential viewsheds and viewpoints to be preserved.

(5) Historic features. The development may protect in perpetuity historically significant buildings and landscapes, identified as such in the Community Development Plan, that include buildings and associated uses that are maintained and visually separated from the developed portion of the OSRD. Structures or landscapes not identified may be determined by sufficient evidence presented to the Planning Board during review of the development. Such evidence may include listing or eligibility for listing on the National Register of Historic Landmarks, or the Massachusetts Register of Historic Landmarks.

I. Homeowners' association.

(1) In the event that ownership of the land will remain with the homeowners in the open space residential development, a nonprofit homeowners' association shall be established, requiring membership of each lot owner in the open space residential development.

(2) The association shall be responsible for the permanent maintenance of all common lands, common open space, recreational and thoroughfare facilities, except where such responsibility is assumed by another owner of the common land (land trust or conservation organization).

(3) A homeowners' association agreement or covenant that will guarantee continuing maintenance of such common utilities, land and facilities, and assessing each lot a share of maintenance expenses shall be submitted with the final subdivision application. Where no homeowners' association is proposed, an alternative plan shall be submitted with the final subdivision application.

(4) Such agreement must be reviewed and approved by Agawam's legal counsel and the Planning Board, and shall be recorded in the Hampden County Registry of Deeds. Such agreements or covenants shall provide that in the event that the association fails to maintain the common open land in reasonable order and condition in accordance with the agreement, the Town may, after notice to the association and public hearing, enter upon such land and maintain it in order to preserve taxable values of the properties within the development and to prevent the common land from becoming a public nuisance. The covenants shall also provide that the cost of such maintenance by the Town shall be assessed equally against each of the properties within the development.

§ 180-113. Residence A-6 Low-Density Multifamily Community District. [Added 8-12-2013 by TOR-2013-6]

A. Purpose. It is the purpose of this district to allow for greater variety and flexibility in the development of housing types and to facilitate the construction and maintenance of streets, utilities and public services in a more economical and efficient manner while at the same time conserving important natural site features and permanently preserving open space.

B. Application.

(1) A site plan for a low-density multifamily community in conformance with § 180-13 shall be submitted to the Planning Board. The following additional information shall be required:

(a) A development statement listing the development team, setting forth the development concept, including in tabular form the number of units, type, size (number of bedrooms, amount of living space, gross floor area), ground coverage and summary showing the area of residential development and common open space as a percentage of the total area.

(b) A development site plan of the entire tract in accordance with the requirements of this section and meeting, to the extent applicable, the requirements set forth for a definitive plan in the Agawam Subdivision Rules and Regulations.[15]

(c) Architectural rendering of the site plans and typical structures, including floor plans and elevations.

(d) A traffic study will be required. This study shall be performed by a professional engineer registered in the Commonwealth of Massachusetts. It may include, at the discretion of the Planning Board, analysis of existing and proposed traffic conditions, driveway design, traffic signal warrant analysis, parking lot size and layout recommendations, a description of impacts on local and regional traffic due to the development, including an area and for a build-out time period as prescribed by the Planning Board. Depending on the location of the proposed curb cut, existing traffic characteristics and the volume of traffic generated by the proposal, a traffic signal may be warranted at one or all points of access. Any traffic control devices to serve the development would be designed, funded, and constructed by the project proponent at the time of the initial development or by the homeowners' association in the future. If, as a result of the traffic study, off-site traffic remediation is determined to be warranted, it shall be the responsibility of the project proponent. If the number of parking stalls required in the parking analysis exceeds the number required in the Town Code, the larger number shall be required.

(e) An engineering report regarding the adequacy of sewage disposal, water supply and stormwater drainage, including the impact of the proposed design on the existing municipal utility infrastructure of the Town.

(f) Marketing and management information, including unit selling prices, construction schedule, and phasing schedule.

(2) Said application shall contain sufficient information so that the Planning Board can determine the applicability of said application for the following items:

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15. Editor's Note: See 159, Subdivision of Land.

(a) Is consistent with the Master Plan of the Town of Agawam;

(b) Preserves and protects the character of the Town and especially the immediate neighborhood, giving due consideration to such features as public safety, including traffic control and traffic impact upon surrounding roads; development of adequate facilities for the use of the residents of said proposal; adequate fire protection, public health, including sewage disposal, drainage and water supply; and the compatibility of the size, location, architecture and landscaping of said project with the adjacent neighborhood and the Town;

(c) Minimizes potential adverse environmental impacts upon the Town;

(d) Is likely to result in a financially stable, soundly and attractively constructed and well managed and maintained project; and

(e) Conforms to the specific provisions of this chapter, including the design guidelines of this section.

(3) Said site plan approval shall not be issued unless the Planning Board affirmatively determines that each of the above-listed criteria is met by said applicant.

C. Use regulations. The following uses shall be permitted in a low-density multifamily community:

(1) One-family detached dwellings.

(2) Two-family detached dwellings.

(3) Recreational uses and community facilities, such as parks, gardens, swimming pools, tennis courts, clubhouses and community buildings.

(4) Accessory uses customarily incidental and subordinate to the principal uses listed above, but expressly excluding any commercial or retail enterprises.

D. Dimensional requirements. A low-density multifamily community shall comply with the following dimensional requirements:

(1) Minimum parcel size. The total parcel shall have a minimum area of not less than 10 acres.

(2) Minimum parcel frontage. The total parcel shall have a minimum frontage on a public way of at least 150 feet.

(3) Front, side and rear yards. The minimum front yard (setback) shall be 25 feet from the interior paved way. The minimum front yard (setback) shall be 50 feet where it abuts a public way only. The side yard and rear yard requirements shall be 50 feet, inclusive of a landscaped buffer strip of not less than 15 feet, and shall pertain only to the periphery of the development. Additional buffering may be required in sensitive areas at the discretion of the Planning Board. The Planning Board may modify or waive the buffering requirement where variations in topography, natural features and vegetation, or compatible land uses, obviate the need for such a buffer.

E. Density regulations. The maximum number of dwelling units permitted within a low-density multifamily community shall be determined by the Planning Board to assure

compliance with the purpose and intent of these regulations, and in any event shall not exceed an average of four units per acre of usable land area.

F. Building requirements.

(1) Building character. The low-density multifamily community shall be an architecturally integrated development. An architectural theme shall be carried out by the use of common building materials, color, exterior detailing, bulk and/or rooflines. Design characteristics shall be stated in the development application and shall include, but not be limited to, building materials, architectural design, and street furniture, which shall require Planning Board approval.

(2) Building location. Building location and orientation shall reflect:

(a) The relationship to street line and to other buildings in the development if in close proximity, in order to protect privacy and create visual coherence.

(b) Views, solar access and access to common open space in order to enhance an occupant's interest.

(c) Organization of large developments into recognizable subareas in order to provide scale and identity.

(d) Avoidance of major topography changes and destruction of significant natural site features, including removal of native trees or vegetation, in order to preserve and protect the environment.

(e) Reduction of visual intrusion into abutting properties in order to protect existing character to the extent practicable.

(3) Community facility. Unless waived by the Planning Board, the development shall establish a community room or facility for use by the residents. Such facility may provide community space for mail, indoor recreation, meetings, and other functions held by the residents.

G. Maximum building height. The maximum height of structures shall be two stories or 35 feet above the ground.

H. Minimum setback distance between buildings. The minimum setback distance between buildings shall be 30 feet.

I. Stairways. All egress stairways are to be contained within the building structure proper.

J. Utilities.

(1) Each dwelling in a low-density multifamily community shall be provided with access drainage and utilities that are functionally equivalent to that provided under the Planning Board's Subdivision Regulations.[16] All utilities shall be placed underground.

(2) All dwelling units shall be serviced by a public water supply deemed adequate for fire protection and domestic use.

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16. Editor's Note: See 159, Subdivision of Land.

(3) All dwelling units shall be connected to public sewers if available. If public sewers are not available, all dwelling units shall be serviced with on-site sewage disposal systems which shall be designed to meet the requirements of approval from the Agawam Board of Health and/or the Massachusetts Department of Environmental Protection as necessary.

(4) All outdoor lighting in the development shall be designed to improve visibility, safety and a sense of security while minimizing energy use, operating costs, glare and light pollution. Outdoor lighting shall be designed to prevent misdirected or excessive artificial light. Building areas shall not be floodlit. Roadways, parking areas, walkways and other public areas shall be illuminated only by properly positioned, high-efficiency, full-cutoff-shielded lighting fixtures not higher than 15 feet in height.

K. Parking and circulation requirements.

(1) There shall be an adequate, safe and convenient arrangement of pedestrian circulation, roadways, driveways and parking.

(2) Vehicular access to the low-density multifamily community shall be provided from an existing public way which, in the opinion of the Planning Board, is adequate to service the proposed development. As a matter of public safety, an additional access may be required.

(3) All roads within the low-density multifamily community shall be privately owned and maintained and shall be designed with sufficient width, suitable grade and adequate construction to safely provide for the needs of vehicular traffic generated by the development. Access roads shall be designed and constructed according to the requirements of the Agawam Subdivision Rules and Regulations[17] or as otherwise modified by the Planning Board.

(4) Garages or off-street parking spaces, or a combination thereof, shall be provided for all occupants, employees, and visitors, and shall be not less than two garage spaces per dwelling unit. Road widths and other factors will be evaluated when considering on-street parking.

(5) The development shall be served by sidewalks in accordance with the Planning Board Subdivision Rules and Regulations. The use of exterior stairs and raised curbing in areas where there will be pedestrian activity shall be minimized.

L. Landscaping requirements.

(1) A coordinated landscape design for the entire project area, including landscaping of structures, parking areas, driveways and walkways, and buffer strips shall be submitted for approval by the Planning Board.

(2) Wherever possible, existing trees and vegetative cover shall be conserved and integrated into the landscape design.

17. Editor's Note: See 159, Subdivision of Land.

(3) Proper maintenance of the landscaping, including the buffer strip, shall be the responsibility of the owner and shall be a condition of conformance with the Zoning Bylaws.

M. Common open space requirements.

(1) All land within the low-density multifamily community which is not covered by buildings, roads, driveways, parking areas or other development, or which is not set aside as private yards, patios or gardens for the residents, shall be common open space. The area of the common open space shall equal at least 30% of the total area of the active adult community tract. Such land shall have a shape, dimension, character and location suitable to assure its use for park, recreation, conservation or agricultural purposes by all the residents of the development.

(2) Suitable and usable outdoor recreational area or areas shall be provided for the use of tenants. At least 1,000 square feet per dwelling unit must be usable open space for active and passive recreation. [This amount may be included in the 30% common open space requirement set forth in Subsection M(1) above.] Such space shall not include wetlands as determined by the Conservation Commission. Usable open space may be defined to include land for community gardens, hiking/jogging paths, tennis courts, swimming pools or similar facilities.

(3) Further subdivision of common open land or its use for other than recreation, conservation, or agriculture, except for easements for underground utilities, shall be prohibited.

(4) Provision shall be made so that the common open space shall be owned in common and readily accessible to the owners and residents of all units in the development or by a membership corporation, trust or association whose members are the owners and residents of the units. In all cases the common open space shall be subject to a perpetual restriction running to or enforceable by the Town which shall be recorded in respect to such land. Such restriction shall be in such form and substance as the Planning Board shall prescribe and may contain such additional restrictions on development as the Planning Board may deem appropriate.

N. Community association.

(1) An owners' association shall be established requiring membership of each unit owner in the low-density multifamily community. The association shall be responsible for the permanent maintenance of communal water, sewage, and recreational and thoroughfare facilities. An association agreement or covenant shall be submitted with the application guaranteeing the continuing maintenance of such common utilities, land and facilities, assessing each unit a share of maintenance expenses. Such agreement shall be subject to the review and approval of Agawam legal counsel and the Planning Board and shall be recorded in the Hampden County Registry of Deeds.

(2) Such agreements or covenants shall provide that in the event that the association fails to maintain the common facilities in reasonable order and condition in accordance with the agreement, the Town may, after notice to the association and public hearing, enter upon such land and maintain it in order to preserve the taxable value of the properties within the development and to prevent the common land from becoming a

public nuisance. The covenants shall also provide that the cost of such maintenance by the Town shall be assessed ratably against the properties within the development.

O. Project identification.

(1) As a condition of its approval, the Planning Board may permit a sign showing the project name to be permanently affixed at each entrance to the development, which shall be designed to be compatible with the character of the development and the surrounding neighborhood. Each sign shall be of a size and design to be approved by the Planning Board, provided that no such sign shall exceed 32 square feet in size.

(2) All streets shall be posted with standard street signs, and all street names shall be approved by the Planning Board. Dwelling units shall be assigned street numbers as assigned by the Assessor's office.

P. Enforcement.

(1) As a condition of its approval, the Planning Board may establish time limits for any development or phases thereof.

(2) Before any building permits are issued for buildings in a given phase, the developer may be required to provide the Town with performance security in a form and amount satisfactory to the Planning Board to guarantee the construction of required site improvements.

Q. Waivers. The Planning Board may waive or modify any requirement of this section for compelling reasons of safety, aesthetics or site design.

§ 180-114. (Reserved)

§ 180-115. Residence A-5 Age-Restricted Housing District. [Added 4-3-2006 by TR-2006-9[18]]

A. Purpose. It is the purpose of this district to allow for greater variety and flexibility in the development of housing types and to facilitate the construction and maintenance of streets, utilities and public services in a more economical and efficient manner while at the same time conserving important natural site features and permanently preserving open space.

B. Age-restricted occupancy. The active adult community shall provide age-restricted housing comprised of dwelling units limited to use and occupancy primarily by persons at least 55 years of age or older, who are able to maintain an active, independent lifestyle without the help of additional on-site support services.

(1) Not more than three residents shall occupy any dwelling unit.

(2) All occupants of a dwelling unit shall be age 55 or older except as follows:

(a) A spouse or cohabitating partner of an occupant age 55 or older;

(b) An occupant who survives his or her spouse or partner;

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18. This resolution inadvertently placed § 180-115 into Art. XV. The section was reassigned to Art. XVI 12-4-2006 by TOR-2006-12.

(c) Not more than one child residing with his or her parent(s), provided that said child is 18 years of age or older.

(3) The owner of the development shall publish and follow policies and procedures that demonstrate the intent to be housing for persons 55 and older, including federal Housing and Urban Development (HUD) rules for verification of occupancy.

C. Application.

(1) A site plan for an active adult community in conformance with § 180-13 shall be submitted to the Planning Board. The following additional information shall be required:

(a) A development statement listing the development team, setting forth the development concept, including in tabular form the number of units, type, size (number of bedrooms, amount of living space, gross floor area), ground coverage and summary showing the area of residential development and common open space as a percentage of the total area.

(b) A development site plan of the entire tract in accordance with the requirements of this section and meeting, to the extent applicable, the requirements set forth for a definitive plan in the Agawam Subdivision Rules and Regulations.

(c) Architectural rendering of the site plans and typical structures, including floor plans and elevations.

(d) A traffic study will be required. This study shall be performed by a professional engineer registered in the Commonwealth of Massachusetts. It may include, at the discretion of the Planning Board, analysis of existing and proposed traffic conditions, driveway design, traffic signal warrant analysis, parking lot size and layout recommendations, a description of impacts on local and regional traffic due to the development, including an area and for a build-out time period as prescribed by the Planning Board. Depending on the location of the proposed curb cut, existing traffic characteristics and the volume of traffic generated by the proposal, a traffic signal may be warranted at one or all points of access. Any traffic control devices to serve the development would be designed, funded, and constructed by the project proponent at the time of the initial development or by the homeowners's association in the future. If, as a result of the traffic study, off-site traffic remediation is determined to be warranted, it shall be the responsibility of the project proponent. If the number of parking stalls required in the parking analysis exceed the number required in the Town Code, the larger number shall be required.

(e) An engineering report regarding the adequacy of sewage disposal, water supply and stormwater drainage, including the impact of the proposed design on the existing municipal utility infrastructure of the Town.

(f) Marketing and management information, including unit selling prices, construction schedule, phasing schedule, and drafts of policies and procedures that demonstrate the intent to be housing for persons 55 and older.

(2) Said application shall contain sufficient information so that the Planning Board can determine the applicability of said application for the following items:

(a) Is consistent with the Master Plan of the Town of Agawam;

(b) Preserves and protects the character of the Town and especially the immediate neighborhood, giving due consideration to such features as public safety, including traffic control and traffic impact upon surrounding roads; development of adequate facilities for the use of the residents of said proposal; adequate fire protection, public health including sewage disposal, drainage and water supply; and the compatibility of the size, location, architecture and landscaping of said project with the adjacent neighborhood and the Town;

(c) Minimizes potential adverse environmental impacts upon the Town;

(d) Is likely to result in a financially stable, soundly and attractively constructed and well managed and maintained project; and

(e) Conforms to the specific provisions of this chapter, including the design guidelines of this section.

(3) Said site plan approval shall not be issued unless the Planning Board affirmatively determines that each of the above-listed criteria is met by said applicant.

D. Use regulations. The following uses shall be permitted in an active adult community:

(1) One-family detached dwellings.

(2) Two-family detached dwellings.

(3) Recreational uses and community facilities, such as parks, gardens, swimming pools, tennis courts, clubhouses and community buildings.

(4) Accessory uses customarily incidental and subordinate to the principal uses listed above, but expressly excluding any commercial or retail enterprises.

E. Dimensional requirements. An active adult community shall comply with the following dimensional requirements:

(1) Minimum parcel size. The total parcel shall have a minimum area of not less than 10 acres.

(2) Minimum parcel frontage. The total parcel shall have a minimum frontage on a public way of at least 150 feet.

(3) Front, side and rear yards. The minimum front yard (setback) shall be 25 feet from the interior paved way. The minimum front yard (setback) shall be 50 feet where it abuts a public way only. The side yard and rear yard requirements shall be 50 feet inclusive of a landscaped buffer strip of not less than 15 feet and shall pertain only to the periphery of the development. Additional buffering may be required in sensitive areas at the discretion of the Planning Board. The Planning Board may modify or waive the buffering requirement where variations in topography, natural features and vegetation, or compatible land uses obviate the need for such a buffer. **[Amended 12-4-2006 by TOR-2006-12]**

F. Density regulations. The maximum number of dwelling units permitted within an active adult community shall be determined by the Planning Board to assure compliance with the purpose and intent of these regulations, and in any event shall not exceed an average of four units per acre of usable land area.

G. Building requirements.

(1) Building character. The active adult community shall be an architecturally integrated development. An architectural theme shall be carried out by the use of common building materials, color, exterior detailing, bulk and/or rooflines. Design characteristics shall be stated in the development application and shall include, but not be limited to, building materials, architectural design, and street furniture, which shall require Planning Board approval.

(2) Building location. Building location and orientation shall reflect:

(a) The relationship to street line and to other buildings in the development if in close proximity, in order to protect privacy and create visual coherence.

(b) Views, solar access and access to common open space in order to enhance an occupant's interest.

(c) Organization of large developments into recognizable subareas in order to provide scale and identity.

(d) Avoidance of major topography changes and destruction of significant natural site features, including removal of native trees or vegetation, in order to preserve and protect the environment.

(e) Reduction of visual intrusion into abutting properties in order to protect existing character to the extent practicable.

(3) Community facility. Unless waived by the Planning Board, the development shall establish a community room or facility for use by the residents. Such facility may provide community space for mail, indoor recreation, meetings, and other functions held by the residents.

H. Maximum building height. The maximum height of structures shall be two stories or 35 feet above the ground.

I. Minimum setback distance between buildings. The minimum setback distance between buildings shall be 30 feet.

J. Stairways. All egress stairways are to be contained within the building structure proper.

K. Utilities.

(1) Each dwelling in an active adult community shall be provided with access drainage and utilities that are functionally equivalent to that provided under the Planning Board's Subdivision Regulations. All utilities shall be placed underground.

(2) All dwelling units shall be serviced by a public water supply deemed adequate for fire protection and domestic use.

(3) All dwelling units shall be connected to public sewers if available. If public sewers are not available, all dwelling units shall be serviced with on-site sewage disposal systems which shall be designed to meet the requirements of approval from the Agawam Board of Health and/or the Massachusetts Department of Environmental Protection as necessary.

(4) All outdoor lighting in the development shall be designed to improve visibility, safety and a sense of security while minimizing energy use, operating costs, glare and light pollution. Outdoor lighting shall be designed to prevent misdirected or excessive artificial light. Building areas shall not be floodlit. Roadways, parking areas, walkways and other public areas shall be illuminated only by properly positioned, high-efficiency, full-cutoff-shielded lighting fixtures not higher than 15 feet in height.

L. Parking and circulation requirements.

(1) There shall be an adequate, safe and convenient arrangement of pedestrian circulation, roadways, driveways and parking.

(2) Vehicular access to the active adult community shall be provided from an existing public way which, in the opinion of the Planning Board, is adequate to service the proposed development. As a matter of public safety, an additional access may be required.

(3) All roads within the active adult community shall be privately owned and maintained and shall be designed with sufficient width, suitable grade and adequate construction to safely provide for the needs of vehicular traffic generated by the development. Access roads shall be designed and constructed according to the requirements of the Agawam Subdivision Rules and Regulations or as otherwise modified by the Planning Board.

(4) Garages or off-street parking spaces, or a combination thereof, shall be provided for all occupants, employees, and visitors, and shall be not less than two garage spaces per dwelling unit. Road widths and other factors will be evaluated when considering on-street parking.

(5) The development shall be served by sidewalks in accordance with the Planning Board Subdivision Rules and Regulations. The use of exterior stairs and raised curbing in areas where there will be pedestrian activity shall be minimized.

M. Landscaping requirements.

(1) A coordinated landscape design for the entire project area, including landscaping of structures, parking areas, driveways and walkways, and buffer strips shall be submitted for approval by the Planning Board.

(2) Wherever possible, existing trees and vegetative cover shall be conserved and integrated into the landscape design.

(3) Proper maintenance of the landscaping, including the buffer strip, shall be the responsibility of the owner, and shall be a condition of conformance with the Zoning Bylaws.

N. Common open space requirements.

(1) All land within the active adult community which is not covered by buildings, roads, driveways, parking areas or other development, or which is not set aside as private yards, patios or gardens for the residents, shall be common open space. The area of the common open space shall equal at least 30% of the total area of the active adult community tract. Such land shall have a shape, dimension, character and location suitable to assure its use for park, recreation, conservation or agricultural purposes by all the residents of the development.

(2) Suitable and usable outdoor recreational area or areas shall be provided for the use of tenants. At least 1,000 square feet per dwelling unit must be usable open space for active and passive recreation. [This amount may be included in the thirty-percent common open space requirement set forth in Subsection N(1) above.] Such space shall not include wetlands as determined by the Conservation Commission. Usable open space may be defined to include land for community gardens, hiking/jogging paths, tennis courts, swimming pools or similar facilities.

(3) Further subdivision of common open land or its use for other than recreation, conservation, or agriculture, except for easements for underground utilities shall be prohibited.

(4) Provision shall be made so that the common open space shall be owned in common and readily accessible to the owners and residents of all units in the development or by a membership corporation, trust or association whose members are the owners and residents of the units. In all cases the common open space shall be subject to a perpetual restriction running to or enforceable by the Town which shall be recorded in respect to such land. Such restriction shall be in such form and substance as the Planning Board shall prescribe, and may contain such additional restrictions on development as the Planning Board may deem appropriate.

O. Community association.

(1) An owners' association shall be established requiring membership of each unit owner in the active adult community. The association shall be responsible for the permanent maintenance of communal water, sewage, recreational and thoroughfare facilities. An association agreement or covenant shall be submitted with the application guaranteeing the continuing maintenance of such common utilities, land and facilities, assessing each unit a share of maintenance expenses. Such agreement shall be subject to the review and approval of Agawam legal counsel and the Planning Board and shall be recorded in the Hampden County Registry of Deeds.

(2) Such agreements or covenants shall provide that in the event that the association fails to maintain the common facilities in reasonable order and condition in accordance with the agreement, the Town may, after notice to the association and public hearing, enter upon such land and maintain it in order to preserve the taxable value of the properties within the development and to prevent the common land from becoming a public nuisance. The covenants shall also provide that the cost of such maintenance by the Town shall be assessed ratably against the properties within the development.

P. Project identification.

(1) As a condition of its approval, the Planning Board may permit a sign showing the project name to be permanently affixed at each entrance to the development, which shall be designed to be compatible with the character of the development and the surrounding neighborhood. Each sign shall be of a size and design to be approved by the Planning Board, provided that no such sign shall exceed 32 square feet in size.

(2) All streets shall be posted with standard street signs, and all street names shall be approved by the Planning Board. Dwelling units shall be assigned street numbers as assigned by the Assessor's Office.

Q. Enforcement.

(1) As a condition of its approval, the Planning Board may establish time limits for any development or phases thereof.

(2) Before any building permits are issued for buildings in a given phase, the developer may be required to provide the Town with performance security in a form and amount satisfactory to the Planning Board to guarantee the construction of required site improvements.

R. Waivers. The Planning Board may waive or modify any requirement of this section for compelling reasons of safety, aesthetics or site design.

ARTICLE XVII
Historic Preservation Overlay District
[Added 3-19-2007 by TOR-2007-1[19]]

§ 180-116. Purpose.

The purpose of this article is to create an overlay district to allow for the conversion of Agawam's historic structures while preserving the character of nearby residential neighborhoods; to encourage the preservation, reuse and renovation of historic properties; and to promote diversified housing opportunities.

§ 180-117. Application.

The Historic Preservation (HPOD) Overlay District shall be applied in all zoning districts. Within the HPOD all regulations of the underlying district(s) shall continue to be in full force and effect, except where these regulations supersede such underlying requirements or provide an alternative to such requirements.

§ 180-118. Historic eligibility.

An historic structure or historic place must meet one of the following criteria:

A. Be included in the Agawam Inventory of Historic Structures prepared by the Agawam Historical Commission, as amended from time to time, including buildings listed for which complete surveys may be pending; or

B. Be listed on or be within an area listed on the National Register of Historic Places or be subject of a pending application for listing on the National Register of Historic Places, or have been determined to be eligible by the Massachusetts Historical Commission for listing, either individually or within an historic district, on the National Register of Historic Places.

§ 180-119. Conditions for conversion of existing buildings.

A. Existing buildings being converted under the terms of this article are not subject to the minimum lot area, minimum setbacks, maximum building height, or maximum number of stories requirements listed in the underlying district. Additions or alterations to the existing structures are subject to the height and setback requirements of the underlying district.

B. Existing buildings on existing lots that are deficient in frontage may be converted under the terms of this section without a variance, but existing lots which meet or exceed the minimum required frontage may not be subdivided in such a manner as to leave the existing building on a lot that lacks the minimum required frontage.

C. The exterior design of the structure shall be maintained to the greatest extent possible.

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19. Editor's Note: This ordinance adopted this material as Art. XVI, §§ 180-112 through 180-117. As the Code already contained an Art. XVI, and §§ 180-112 through 180-115, this material was renumbered as Art. XVII, §§ 180-116

through 180-122.

D. The original building area is not to be increased more than 10% of its gross floor area. Additions and alterations made to comply with the requirements of the Americans with Disabilities Act are not subject to this limit.

§ 180-120. Grant of special permit.

The Agawam City Council may grant a special permit to authorize actions upon and uses of historic structures and historic places that exceed those allowed in the underlying district, if such actions or uses comply with the requirements of this section, § 180-11, and are in the Town of Agawam's best interest to preserve and enhance historic structures and historic places.

§ 180-121. Review of special permit application.

Whenever an application for such a special permit is filed with the City Council, the applicant shall also file, within five working days of the filing of the completed application, copies of the application, accompanying site plan, and other documentation to the Agawam Historical Commission, the Agawam Planning Board, the Agawam Health Department, the Agawam Fire Department and the Agawam Safety Officer for their consideration, review and report. The copies necessary to fulfill this requirement shall be furnished by the applicant. Reports from other boards and officials shall be submitted to the City Council by the date of the public hearing, but in any case within 35 days of the receipt of the reviewing party of all of the required materials; failure of these reviewing parties to make recommendations after having received copies of all such required materials shall be deemed a lack of opposition thereto.

§ 180-122. Permitted uses.

Allowed uses, if found to be appropriate by the Agawam City Council, shall be limited to residential, and bed-and-breakfast homes allowing a maximum of one week's stay.[20]

20. Editor's Note: Former Art. XVIII, Temporary Parking, added 6-18-2007 by TOR-2007-6, was repealed 11-19-2007.

ARTICLE XVIII
Medical Marijuana Facilities
[Added 9-16-2013 by TOR-2013-7; amended 5-5-2014 by TOR-2014-1]

§ 180-123. Purpose.

A. It is recognized that the nature of the substance cultivated, processed, and/or sold by medical marijuana treatment centers and off-site medical marijuana dispensaries may have objectionable operational characteristics and should be located in such a way as to ensure the health, safety, and general well-being of the public as well as patients seeking treatment. The specific and separate regulation of registered marijuana dispensaries ("RMD") as medical marijuana treatment centers and off-site medical marijuana dispensary ("OMMD") facilities is necessary to advance these purposes and ensure that such facilities are not located within close proximity of minors and do not become concentrated in any one area within the Town of Agawam.

B. Subject to the provisions of this Zoning Bylaw, Chapter 40A of the Massachusetts General Laws, and 105 CMR 725.000, registered marijuana dispensaries and off-site medical marijuana dispensaries will be permitted to provide medical support, security, and physician oversight that meet or exceed state regulations as established by the Massachusetts Department of Health ("MDPH").

§ 180-124. Additional requirements/conditions.

In addition to the standard requirements for uses requiring a special permit and site plan approval, the following shall also apply to all registered marijuana dispensaries and off-site medical marijuana dispensaries:

A. Use.

(1) RMD and OMMD facilities may only be involved in the uses permitted by its definition and may not include other businesses or services.

(2) No marijuana shall be smoked, eaten or otherwise consumed or ingested within the premises.

(3) The hours of operation shall be set by the special permit granting authority, but in no event shall an RMD or OMMD facility be open to the public, and no sale or other distribution of marijuana shall occur upon the premises or via delivery from the premises, between the hours of 8:00 p.m. and 8:00 a.m.

(4) RMD facilities that can demonstrate that they comply with the agricultural exemption under MGL c. 40A, § 3 must still apply for site plan approval.

B. Physical requirements.

(1) All aspects of the use/facility relative to the acquisition, cultivation, possession, processing, sales, distribution, dispensing, or administration of marijuana, products containing marijuana, related supplies, or educational materials must take place at a fixed location within a fully enclosed building and shall not be visible from the exterior of the business.

(2) No outside storage is permitted.

(3) No OMMD facility shall have a gross floor area in excess of 2,500 square feet.

(4) Ventilation. All RMD and OMMD facilities shall be ventilated in such a manner that no:

(a) Pesticides, insecticides or other chemicals or products used in the cultivation or processing are dispersed into the outside atmosphere; and

(b) No odor from marijuana or its processing can be detected by a person with an unimpaired and otherwise normal sense of smell at the exterior of the medical marijuana business or at any adjoining use or property.

C. Signage.

(1) Signage shall be displayed on the exterior of the RMD and OMMD facility's entrance, in plain sight of clients, stating "Registration Card Issued by the Massachusetts Department of Public Health Required," in text two inches in height.

(2) All signage must conform to the requirements of § 180-7 of these bylaws.

(3) In addition, all signage must conform to the requirements of 105 CMR 725.105(L) as amended.

D. Location.

(1) No RMD or OMMD facility shall be located on a parcel which is within 500 feet (to be measured in a straight line from the nearest points of each property line) of a parcel occupied by:

(a) A public or private elementary, junior high, middle, vocational or high school, college, junior college, university or child-care facility or any other use in which children commonly congregate in an organized, ongoing, formal basis; or

(b) Another RMD or OMMD facility, except that this limitation shall not apply in Industrial Zones.

(2) No RMD or OMMD facility shall be located on a lot which abuts a residential use (including commercial residential uses such as hotels, motels, lodging houses, etc.) or residential zoning district.

(3) No RMD or OMMD facility shall be located inside a building containing residential units, including transient housing such as motels and dormitories.

E. Reporting requirements.

(1) All special permit and site plan approval holders for an RMD or OMMD facility shall provide the Police Department, Fire Department, Building Inspector and the special permit granting authority with the names, phone numbers and e-mail addresses of all management staff and key holders, including a minimum of two operators or managers of the facility identified as contact persons to whom one can provide notice if there are operating problems associated with the establishment. All such contact information shall be updated as needed to keep it current and accurate.

(2) The local Building Inspector, Board of Health, Police Department, Fire Department and special permit granting authority (in cases where a special permit and site plan approval were granted) shall be notified, in writing, by an RMD or OMMD facility owner/operator/manager:

(a) A minimum of 30 days prior to any change in ownership or management of that facility.

(b) A minimum of 12 hours following a violation or potential violation of any law or any criminal or potential criminal activities or attempts of violation of any law at the RMD or OMMD.

(3) Permitted RMD and OMMD facilities shall file an annual report to and appear before the special permit granting authority no later than January 31, providing a copy of all current applicable state licenses for the facility and/or its owners and demonstrating continued compliance with the conditions of the special permit.

(4) The owner or manager is required to respond by phone or e-mail within 24 hours of contact by a city official concerning his or her RMD or OMMD at the phone number or e-mail address provided to the city as the contact for the business.

F. Issuance/transfer/discontinuance of use.

(1) Special permits/site plan approvals shall be issued to the RMD operator.

(2) Special permits/site plan approvals shall be issued for a specific site/parcel.

(3) Special permits/site plan approvals shall be nontransferable to either another RMD operator or site/parcel.

(4) Special permits/site plan approvals shall have a term limited to the duration of the applicant's ownership/control of the premises as an RMD or OMMD, and shall lapse:

(a) If the permit holder ceases operation of the RMD; and/or

(b) The permit holder's registration by MDPH expires or is terminated.

(5) The permit holder shall notify the Zoning Enforcement Officer and special permit granting authority, in writing, within 48 hours of such lapse, cessation, discontinuance or expiration.

(6) An RMD or OMMD facility shall be required to remove all material, plants, equipment and other paraphernalia prior to surrendering its state registration or ceasing its operation.

(a) Prior to the issuance of a building permit for an RMD or OMMD, the applicant is required to post with the Town Treasurer a bond, or other form of financial security acceptable to said Treasurer, in an amount set by the Planning Board. The amount shall be sufficient to cover the costs of the Town removing all materials, plants, equipment and other paraphernalia if the applicant fails to do so. The Building Inspector shall give the applicant 45 days' written notice in advance of taking such action. Should the applicant remove all materials, plants, equipment and other paraphernalia to the satisfaction of the Building Inspector

prior to the expiration of the 45 days' written notice, said bond shall be returned to the applicant.

§ 180-125. Application requirements.

In addition to the standard application requirements for special permits and site plan approvals, such applications for an RMD or OMMD facility shall include all of the following:

A. The name and address of each owner of the RMD or OMMD facility/operation;

B. A copy of its registration as an RMD from the Massachusetts Department of Public Health or documentation that demonstrates that said RMD or OMMD facility, and its owner/operators, qualifies and is eligible to receive a certificate of registration and meets all of the requirements of an RMD in accordance with 105 CMR 725.000 of the Massachusetts Department of Public Health;

C. Evidence that the applicant has site control and right to use the site for an RMD or OMMD facility, in the form of a deed or valid purchase and sales agreement or, in the case of a lease, a notarized statement from the property owner and a copy of the lease agreement;

D. A notarized statement signed by the RMD or OMMD organization's chief executive officer and corporate attorney disclosing all of its designated representatives, including officers, directors, shareholders, partners, members, managers, or other similarly situated individuals and entities and their addresses. If any of the above are entities rather than persons, the applicant must disclose the identity of all such responsible individual persons;

E. In addition to what is normally required in a site plan, details showing all exterior proposed security measures for the RMD or OMMD, including lighting, fencing, gates and alarms, etc., ensuring the safety of employees and patrons and to protect the premises from theft or other criminal activity;

F. A detailed floor plan identifying the areas available and functional uses (including square footage);

G. All signage being proposed for the facility;

H. A traffic study to establish the RMD or OMMD impacts at peak demand times; and

I. A management plan including a description of all activities to occur on site, including all provisions for the delivery of medical marijuana and related products to OMMDs or off-site direct delivery to patients.

§ 180-126. Findings.

In addition to the standard findings for a special permit and site plan approval, the special permit granting authority must also find all the following:

A. That the RMD or OMMD facility is designed to minimize any adverse visual or economic impacts on abutters and other parties in interest;

B. That the RMD or OMMD facility demonstrates that it will meet all the permitting requirements of all applicable agencies within the Commonwealth of Massachusetts and will be in compliance with all applicable state laws and regulations;

C. That the applicant has satisfied all of the conditions and requirements of this section and other applicable sections of this article.

D. That the RMD or OMMD project meets a demonstrated need;

E. That the RMD or OMMD facility provides adequate security measures to ensure that no individual participant will pose a direct threat to the health or safety of other individuals, and that the storage and/or location of cultivation is adequately secured; and

F. That the RMD or OMMD facility adequately addresses issues of traffic demand, circulation flow, parking and queuing, particularly at peak periods at the facility, and it impact on neighboring uses.

§ 180-127. through § 180-138. (Reserved)

ARTICLE XIX
Mixed-Use Business C District
[Added 6-2-2014 by TOR-2014-4]

§ 180-139. Scope.

The scope of this article is to regulate mixed-use development in appropriate areas of the Town and to protect the public health, safety, and general welfare in the Town of Agawam by establishing controls that will facilitate flexible development while protecting the public interest.

§ 180-140. Purpose; intent.

A. The purpose of this article is to foster a greater opportunity for creative development by providing guidelines which encourage a mix of uses compatible with existing and neighboring properties, to provide housing and business uses in locations where a variety of Town services are available, to promote utilization of existing buildings and property, and to encourage the provision of open areas.

B. The intent, furthermore, is to encourage interaction among activities located within a mixed-use development, to enhance business vitality, reduce vehicular traffic, provide employment opportunities for residents close to home, ensure the compatibility with each other of the commercial and residential uses, and ensure that the appearance and effects of buildings and uses are harmonious with the character of the area in which they are located by:

(1) Allowing a diversity of uses in close proximity in the district within a limited area, including residential, commercial, and office;

(2) Accommodating mixed-use buildings with neighborhood-serving retail, service and other uses on the ground floor and residential units above;

(3) Encouraging development that exhibits the physical design characteristics of pedestrian-oriented storefront-style shopping streets;

(4) Promoting the opportunity for people to work, meet, shop and utilize services in the vicinity of their residences;

(5) Providing opportunities for the development of affordable housing;

(6) Providing opportunities for a mixture of uses in the same building;

(7) Promoting a positive pedestrian environment in the district;

(8) Facilitating integrated physical design;

(9) Promoting a high level of design quality;

(10) Encouraging the development of flexible space for small and emerging businesses;

(11) Facilitating development proposals responsive to current and future market conditions; and

(12) Encouraging the development of open spaces and parks within the district to accommodate workers, residents, pedestrians, and shoppers.

§ 180-141. Establishment and administration.

A. The Agawam Mixed-Use Business C District shall include the properties listed below. These properties are included by reason of their potential to provide a flexible development area aligned with the purpose of this article.

Assessor's Map, Block and Lot

I14-5-34
I15-9-1
J15-1-1
J15-1-2
J15-1-3
J15-4-1
J15-4-2
J15-4-3
J15-4-4
J14-3-3
J14-3-4
J14-3-5
J14-3-7
J14-4-1
J14-4-2
J14-4-3
J14-4-5
J14-4-6
J14-4-7
J14-4-8
J14-4-9
J14-5-8

B. The provisions of this § 180-141 shall be administered by the Planning Board, except as otherwise provided herein.

C. The Planning Board may waive any information requirements it judges to be unnecessary to the review of a particular plan. Such waiver decisions must be documented in writing by the Planning Board.

§ 180-142. Definitions.

The following definitions shall apply to all mixed-use applications under these zoning ordinances:

ASSISTED LIVING — Housing for adults, with services provided, such as meals, laundry, and housekeeping.

BUSINESS SERVICES — Services used in the conducting of business and commerce, including only:

A. Consumer and mercantile credit reporting;

B. News services;

C. Research, development and testing;

D. Business management and consulting;

E. Insurance company service offices;

F. Real estate offices.

CAFE — A coffee house or small restaurant, often with an enclosed or outdoor section extending onto the sidewalk.

DRIVEWAY — A space, located on a lot, built for access to a garage or off-street parking or loading space.

FAST-FOOD RESTAURANT — An establishment whose principal business is the sale of pre-prepared or rapidly prepared food directly to the customer in a ready-to-consume state for consumption either within the restaurant building or off the premises. Orders are not generally taken at the customer's table, and food is generally served in disposable wrapping or containers.

LIVE/WORK UNIT — A single unit (e.g., studio, loft, or one-bedroom) consisting of both a commercial/office and a residential component that is occupied by the same resident. The live/work unit shall be the primary dwelling of the occupant.

LOT COVERAGE — The area of a lot covered by the footprint of all structures, as well as decks, balconies, porches, and similar architectural features and driveway areas, expressed as a percentage of the total lot area.

MIXED-USE DEVELOPMENT — The development of a tract of land, building, or structure with two or more different uses, such as, but not limited to, residential, office, commercial, institutional, or entertainment, in a compact village form, with vehicular access to an accepted public way. A proposed mixed-use development shall demonstrate that the project shall be served by Town water and sewer service upon completion of the proposed development.

ODOR — A strong and unpleasant smell, for example, a garbage or chemical smell.

PERSONAL SERVICES — Establishments primarily engaged in providing services involving the care of a person or his/her apparel, including but not limited to:

A. Laundering, dry cleaning and garment services not exceeding 5,000 square feet of floor area per establishment;

B. Coin-operated laundries;

C. Shoe repair;

D. Photographic services;

E. Beauty and barber shops;

F. Apparel repair and alteration;

G. Funeral services;

H. Health clubs;

I. Clothing rental.

PROFESSIONAL SERVICES — Services performed by professional persons for business and personal use, including but not limited to:

A. Medical and health offices and clinics;

B. Planning;

C. Engineering and architectural;

D. Accounting;

E. Auditing and bookkeeping;

F. Educational and scientific.

SENIOR AND/OR HANDICAPPED HOUSING or SENIOR APARTMENTS — Age-restricted multi-unit housing for adults 55 and older, or handicapped persons, with self-contained living units for older adults who are able to care for themselves. Usually no additional services such as meals or transportation are provided.

SIT-DOWN RESTAURANT — An eating establishment with turnover rates generally of at least one hour or longer, serving food intended for consumption on the premises.

TREEBELT — Can consist of tree planters, brick pavers, and benches with a minimum width of five feet.

§ 180-143. Use regulations.

A. Uses allowed by right with site plan review in a mixed-use development.

(1) Mixed-use developments may be constructed in the Mixed-Use Development Overlay District with site plan review by the Planning Board in accordance with § 180-13. The following uses may be included by right with site plan review within a mixed-use structure in a mixed-use development:

(a) Retail uses;

(b) Sit-down restaurants;

(c) Cafes and outdoor dining areas;

(d) Multifamily residential uses;

(e) Home occupations;

(f) Professional service offices;

(g) Personal service establishments;

(h) Municipal uses;

(i) Banks or financial institutions, automated teller machines (ATMs);

(j) Health club;

(k) Townhouses (single-family dwellings connected by one or more walls);

(l) Cinema, theater, or auditorium;

(m) Park, recreation or playground;

(n) Artist studio/residence;

(o) Assisted-living residential uses, senior apartments and senior housing;

(p) Artisan manufacturing or production (hand tools only, e.g., jewelry or ceramics);

(q) Civic uses;

(r) Live/work units;

(s) Multiple uses in the same structure;

(t) Bars and cocktail lounges.

(2) The above uses are not allowed as stand-alone structures in this district.

B. Special permit uses in a mixed-use development.

(1) The following uses may be included within a mixed-use development with the approval of a special permit from the Board of Appeals in accordance with §§ 180-11 and 180-12:

(a) Hotel/motel not exceeding 10 guest rooms per establishment;

(b) Dry cleaning, linen cleaning, or diaper services which clean clothing articles on site;

(c) Animal hospitals;

(d) Drive-up service windows associated with banks, pharmacies or cafes;

(e) Fast-food restaurants.

(2) Within a mixed-use development, the above-listed uses shall not be allowed as freestanding buildings.

C. Prohibited uses in a mixed-use development.

(1) The following uses shall not be included within a mixed-use development:

(a) Industrial uses;

(b) Motor vehicle sales, maintenance and repair facilities;

(c) Gasoline filling stations;

(d) Adult entertainment uses;

(e) Automobile or truck sales;

(f) Junkyards.

D. Same-structure/on-site mixed-uses.

(1) Within an approved mixed-use development, there shall be no restriction on combining different categories of use within the same building except any imposed by the State Building Code or other federal, state, or local regulations.

(2) No mixed-use development shall have more than 75% of the total square footage in the development used for residential uses, including multifamily uses, assisted living and senior housing.

E. Special permit criteria for all mixed-use developments.

(1) All mixed-use developments requiring a special permit in § 180-143B above must meet the special permit requirements in § 180-11 and the site plan approval requirements in § 180-13.

(2) All mixed-use developments requiring a special permit must also meet the following additional special permit criteria:

(a) The project complies with the additional performance standards for mixed-use developments in § 180-144 below.

(b) The project is consistent with the purposes of this article, as stated in § 180-140.

F. Dimensional requirements. The dimensional requirements applicable to the Mixed-Use Overlay District are shown in the Table of Dimensional and Density Regulations below:

Table of Dimensional and Density Regulations for the Mixed-Use Business C District

Minimum Lot Area	Minimum Frontage	Minimum Front Yard	Minimum Side Yard	Minimum Rear Yard	Maximum Height	Maximum Lot Coverage	Maximum Setback
0 square feet	25 feet	10 feet	0 feet	20 feet	45 feet/3 stories	75%	15 feet

§ 180-144. Performance standards for mixed-use developments.

To the extent feasible, all mixed-use developments must meet the performance standards in § 180-144 A through O below. No use shall be permitted that causes or results in dissemination of dust, smoke, gas or fumes, excessive odor, noise, vibration or excessive light violating the standards set forth in the performance criteria in this § 180-144 A through Q. Any other performance standards of the Town shall also apply to uses conducted under this § 180-144 of the Agawam Zoning Ordinance.

A. Access and traffic impacts:

(1) Traffic and safety impacts to the existing and proposed roads shall be minimized.

(2) Access provided via shared curb cuts shall be encouraged. Curb cuts shall be as narrow as is feasible, without resulting in traffic safety issues.

(3) Pedestrian and vehicular traffic shall be separated, and walkways shall be provided for access to adjacent properties and between businesses.

(4) Plans must illustrate provisions for safe automobile, pedestrian and bicycle circulation. Provisions must be made for motor vehicle, bicycle, and pedestrian circulation connections to adjacent lots.

(5) The Planning Board shall require a detailed traffic study for the following uses:

(a) High-volume-traffic-generating uses with a trip generation rate over 700 vehicles/day (based on Institute of Transportation Engineers rates found in trip generation);

(b) The construction of a new mixed-use development structure of more than 25,000 square feet in gross floor area; and

(c) Any external enlargement that brings the mixed-use development total to 25,000 square feet gross floor area for all structures.

(6) The Planning Board may waive any or all requirements for a traffic study for external enlargements of less than 2,000 square feet of gross floor area in excess of the 25,000 square feet gross floor area threshold. The traffic impact statement shall contain:

(a) The projected number of motor vehicle trips to enter or leave the site, estimated for daily and peak-hour traffic levels;

(b) The proposed traffic flow pattern for both vehicles and pedestrian access shall be described and related to the site plan, including vehicular movements at all major intersections likely to be affected by the proposed use of the site;

(c) Traffic flow patterns at the site, including entrances and egresses, loading and unloading areas, and curb cuts on site and within 100 feet of the site;

(d) A detailed assessment of the traffic safety impacts of the proposed project or use on the carrying capacity of any adjacent highway or road, including the projected number of motor vehicle trips to enter or depart from the site estimated for daily hour and peak-hour traffic levels, road capacities and impacts on intersection. Existing daily and peak-hour traffic levels and road capacities shall also be given;

(e) A parking lot vehicle traffic and pedestrian circulation plan shall be designed to minimize conflicts and safety problems.

B. Noise:

(1) In order to protect, preserve, and promote the health, safety, welfare, and peace and quiet of the inhabitants of Agawam through the reduction, control, and prevention of such loud or raucous noise that unreasonably disturbs, injures, or endangers the comfort, privacy, repose, health, peace or safety of reasonable persons, all noise levels, measured at a height of four feet above the ground surface at all property lines, using a sound meter which meets the most current American National Standards

Institute's Specification for Type II Sound Level Meters, must not exceed the following standards:

Time of Day	Maximum Sound Level (dBA)
7:00 a.m. to 7:00 p.m.	65*
7:00 p.m. to 11:00 p.m.	50
11:00 p.m. to 7:00 a.m.	45

* Note:

65 dba = normal conversation

50 dba = noise level of a normal working refrigerator

45 dba = a quiet library

(2) These standards shall not apply to power tools and equipment (i.e., lawn mowers, leaf blowers, sweepers, etc.) used in the normal maintenance of the site's outdoor areas (i.e., lawn, garden, parking, etc.). Such outdoor maintenance shall be limited to between the hours of 8:00 a.m. and 7:00 p.m.

C. Emissions and odors:

(1) Emissions and odors shall be completely and effectively confined within the building or so regulated as to prevent any nuisance, hazard, or other disturbance from being perceptible (without the use of instruments) at any lot line of the premises on which the use is located. No emissions are permitted which can:

(a) Cause any damage to health of humans, animals or vegetation;

(b) Cause excessive soiling;

(c) Result in odorous gases or odoriferous matter in such quantities as to be offensive.

(2) The determination of what emissions are in violation of this provision shall be made by the Zoning Enforcement Officer or his/her designee, taking into consideration all of the following:

(a) The level of the odor;

(b) The nature of the odor is usual or unusual;

(c) The origin of the odor is natural or unnatural;

(d) The level of the ambient odor;

(e) The proximity of the odor to living/sleeping facilities;

(f) The nature and zoning of the area from which the odor emanates and the area where it is received;

(g) The duration of the odor; and whether the odor is recurrent, intermittent, or constant.

D. Lighting:

(1) Lighting systems should be designed, constructed, and installed in a manner that controls glare and light trespass, minimizes obtrusive light, conserves energy and resources while maintaining safety, visibility, security of individuals and property and curtailing the degradation of the nighttime visual environment. Evenly distributed lighting throughout a site will minimize impacts on surrounding neighborhoods and increase efficiency. By directing light where it is needed and only the intensity necessary to serve the intended purpose, these standards will prevent glare and its harsh shadows and blind spots.

(2) All lighting shall comply with the following:

(a) Except for approved exterior lighting, operations producing glare shall be conducted entirely within an enclosed building. No direct or sky-reflected glare, whether from floodlights or from high temperature processes such as welding shall be permitted beyond its lot lines onto neighboring properties, or onto any street.

(b) Exterior lighting, including but not necessarily limited to lighting of exterior walls of buildings from an external light source, lighting of parking areas, and lighting of walks and drives, shall be done in such a manner as to direct light away from adjacent lots and public ways.

(c) All outdoor light fixtures and illuminated signs shall be designed, located, installed and directed in such a manner as to prevent light trespass beyond the property line and light above a ninety-degree horizontal plane. If necessary, an applicant may need to provide photometric plans and/or manufacturing specification sheets to show conformance with these standards.

(d) All nonessential lighting, including display, parking, and sign lighting, shall be turned off after business hours, leaving only the lighting necessary for site and pedestrian security, crime prevention and streetlighting.

(e) All lighting shall be recessed and shielded to prevent off-site glare.

(f) Site lighting shall conform to the following output standards:

Maximum (footcandle)	Site Average (footcandle)	Footcandle at Property Line
5	2.5	0

E. Storage:

(1) All materials, supplies and equipment shall be stored in accordance with Fire Prevention Standards of the National Board of Fire Underwriters and shall be screened from view from public ways and abutting properties.

F. Waste disposal:

(1) Waste disposal shall follow state and Town Board of Health regulations.

(2) Storage of waste and waste facilities shall be screened from view from public ways and neighboring properties.

(3) Appropriate provisions shall be made for the disposal of trash, which may include, but shall not be limited to, the provision of trash compactors within the building or on site, as well as a signed annual contract for rubbish removal.

(4) Dumping of dumpsters shall be limited to weekdays between the hours of 7:00 a.m. and 11:00 p.m. only. Dumpsters must be fenced, gated and screened from view.

G. Loading/unloading:

(1) The Planning Board may require that operations, including loading and unloading, shall be limited to weekdays between the hours of 7:00 a.m. and 11:00 p.m. only.

(2) Loading and unloading platforms and doorways specially designed for loading/ unloading are prohibited on the front side of any building.

H. Walkways:

(1) For public convenience, a pedestrian and/or bicycle way or sidewalk system shall connect all uses on the site and otherwise provide appropriate circulation or continuity to an existing pedestrian or bicycle circulation system. These uses include, but are not limited to, residential, parking, transit, bicycling, recreation, and commercial uses.

(2) Walkways and sidewalks must conform to requirements of the Americans with Disabilities Act (ADA) and the Massachusetts Architectural Access Board (MAAB).

(3) Sidewalks are required along all Town streets. A treebelt is required adjacent to sidewalk areas. The Planning Board can waive treebelt requirements in situations where they determine that local conditions warrant.

(4) The development should provide internal and/or public pedestrian connections that are direct, convenient and pleasant with appropriate amenities (e.g., attractive sidewalks and benches).

I. Vehicular access, parking and loading, and shared parking requirements:

(1) Parking shall be located to the side or rear of buildings. In no case shall parking be allowed in the treebelt adjacent to the sidewalk or within the front setback of any lot.

(2) Parking spaces may be located either on or off the lot. Applicant must show proof of space, dedicated to the use, its location relative to the building, and must indicate if the space is owned or leased.

(3) Buildings that do not have frontage on a street must provide access for emergency and service vehicles through the layout and design of driveways, interior service roads, or pedestrian and bicycle circulation corridors.

(4) The Planning Board may allow shared parking in a mixed-use development.

(5) A parking study shall be required for all new structures within the district. A parking study is not required for reuse of existing structures. A formal parking study may be waived for small developments where there is established experience with the land

use mix and its impact is expected to be minimal. If standard rates are not available or limited, the applicant may collect data at similar sites to establish local parking demand rates.

J. Alleys:

(1) Alleys are permitted to access parking in the rear of structures, with Planning Board review.

(2) Alleys must be safe, secure and well lit.

(3) Alleys must be paved, with a minimum width of 10 feet.

K. Development and design standards:

(1) Existing buildings shall be reused for mixed-use developments, where feasible, as a priority over new construction.

(2) Buildings or structures that are listed or eligible for inclusion on the National Register of Historic Places and/or the Massachusetts Register of Historic Places shall be converted, constructed, reconstructed, restored or altered to maintain or promote the status of the building or structure on, or eligibility for inclusion on, the State or National Register of Historic Places.

L. Signs:

(1) Signs shall conform to the existing ordinances of the Town of Agawam in §§ 180-75 through 180-89.

(2) Permitted signs include signs located within the sign band on building facades; awning signs; hanging signs projecting from building facades; window signs and unmovable freestanding signs.

(3) Temporary signs permitted include political signs; special events signs; and for-sale or for-lease signs.

(4) Prohibited signs include flashing signs; roof signs; movable signs; internally lit plastic signs.

(5) Each business may display not more than two permanent signs.

(6) Sign materials should be durable and easy to maintain. Signs may be constructed of wood, metal, stone, gold leaf, glass, canvas or stained glass or encased in a wooden frame.

(7) Sign illumination may include external white light illumination, provided it is shaded from view off the premises, and neon.

(8) Sign size. Signs may not exceed 16 square feet in area.

(9) Sign height. Freestanding pole signs shall have a maximum height of 10 feet; other freestanding signs shall have a maximum height of four feet.

M. Landscaping requirements:

(1) Screening of mechanical equipment, trash, and loading areas shall be provided through the use of walls, fences, and/or dense, evergreen plant materials.

(2) The landscaped perimeter area shall have a minimum width of at least five feet and can consist of tree planters, brick pavers, and benches.

(3) Landscaping shall be provided for driveways and other vehicular use areas to provide visual and climatic relief from broad expanses of pavement and to channelize and define logical areas for pedestrian and vehicular traffic.

(4) Interior parking areas shall be landscaped with sufficient shade trees to provide 50% shade within 15 years of installation.

(5) Completion of the landscaping requirements may be postponed due to seasonal weather conditions for a period not to exceed six months from the time of project completion.

N. Green infrastructure and stormwater runoff:

Commented [CM12]: Can this be duplicated in other districts?

(1) To the extent feasible, mixed-use development projects shall recharge all stormwater on site. The use of green infrastructure strategies for stormwater recharge, such as permeable pavements, tree box filters, green streets, rain gardens, stormwater infiltration basins and green roofs, are strongly encouraged.

(2) Applicants' site plans shall indicate how the proposed development addresses green infrastructure and stormwater recharge.

O. Maintenance of landscaping and screening:

(1) All landscaping and screening shall be maintained by the property owner.

(2) Landscaping and screening plant materials shall not encroach on the public walkways or roadways in a way that impedes pedestrian or vehicular traffic or visibility.

(3) Shrubs or trees that die shall be replaced within one growing season.

P. Appearance/architectural design:

(1) Architectural design shall be compatible with the historic character and scale of buildings in the neighborhood and the Town of Agawam through the use of appropriate building materials, screening, breaks in roof and wall lines and other architectural techniques.

(2) In making its decision, the Planning Board may consider whether the building design is compatible with the following design guidelines:

(a) Exterior facades are faced with stone or brick, or clapboards of wood, aluminum or vinyl;

(b) Exterior facade treatment is compatible on all sides visible from a public way or parking lot;

(c) Facades facing Town streets have windows facing the street.

(3) Variations in architectural detail, form and siting shall be used to provide visual interest and avoid monotony.

(4) Existing buildings subject to reconstruction or rehabilitation and proposed buildings shall be compatible with the historic character and scale of contiguous buildings within the immediate neighborhood vicinity.

(5) Proposed buildings should relate harmoniously to each other.

(6) Buildings shall be designed so that retail, restaurant, and personal-service establishments are strongly encouraged to be located on the ground or below-grade building levels.

(7) The entire building facade must be oriented to front and side street property lines and must be located within 15 feet of such property lines, with sidewalks in front of buildings.

(8) Public open spaces, such as plazas and pocket parks, are encouraged within the development.

Q. Outdoor dining:

(1) Outdoor dining shall be permitted by right, as an accessory use for any restaurant use, and must comply with the following standards:

(a) Alcohol may be served to and consumed by patrons in outdoor dining areas, provided that all necessary licenses are acquired. These licenses are to be gathered through the Liquor Commission, the Building Department and the Board of Health.

(b) The hours of operation of outdoor dining areas may be equal to or less than the hours of operation of the main restaurant. Dining areas which abut residential areas must end outdoor dining and seating by 11:00 p.m.

(c) Litter must be cleaned up regularly.

§ 180-145. Optional affordable housing bonus.

A. A density bonus may be provided by the Planning Board, in return for provision of affordable housing, if the following criteria are met:

(1) At least 10% of the total dwelling units in a mixed-use development may be designated as affordable housing. Affordable housing will be defined as those residential units affordable to a household earning up to 80% of the median income in Agawam's statistical area.

(2) The affordable housing units shall include resale, lease or rental controls that will ensure continued affordability by future low- and moderate-income households. Deed restrictions or similar devices shall be used to limit future sale or rental prices for these purposes.

(3) The affordable units may be located in an existing structure if their construction constitutes a net increase in the number of dwelling units in the development.

B. The Planning Board shall determine the density bonus, which may consist of both of the following:

(1) An increase in building height to a maximum of four stories;

(2) An increase in lot coverage to a maximum of 95%.

Chapter 180

ZONING

GENERAL REFERENCES

Building construction — See Ch. 82.

Fees — See Ch. 103.

Fire prevention — See Ch. 106.

Subdivision of land — See Ch. 159.

Water and sewers — See Ch. 175.

ARTICLE I
General Provisions

§ 180-1. Purpose.

For the purpose of promoting the health, safety, convenience, morals and welfare of its inhabitants, the Town, under the authority granted by MGL c. 40A, §§ 1 to 22 inclusive, does hereby enact this chapter, to be hereafter known and designated as the "Zoning Ordinance" of the Town. Further purposes of this chapter are to lessen congestion in the streets, to secure safety from fire, panic and other danger, to provide adequate light and air, to prevent the overcrowding of land, to avoid undue concentration of population, to facilitate the adequate provision of transportation, water, sewerage, schools, parks and other public requirements and to increase the amenities of the Town.

§ 180-2. Definitions and word usage. [Amended 3-21-1994 by TOR-94-1; 2-20-2001 by TOR-2001-1; 5-20-2002 by TOR-2002-15; 2-6-2006 by TOR-2005-12; 11-5-2008 by TOR-2008-2; 11-7-2012 by TOR-2012-3]

A. For the purpose of this chapter, certain terms and words shall have the following meanings. Words used in the present tense include the future; the plural number includes the singular; the words "used" or "occupied" include the words "designed," "arranged," "intended" or "offered to be used or occupied"; the words "building," "structure," "lot," "land" or "premises" shall be construed as though followed by the words "or any portion thereof"; and the word "shall" is always mandatory and not merely directory.

B. Terms and words not defined herein but defined in the Building Code[1] or Subdivision Regulations[2] shall have the meanings given therein unless a contrary intention clearly appears. Words not defined in either place shall have the meanings given in the most recent edition of Webster's Unabridged Dictionary.

C. Definitions. For the purposes of this chapter, the following words and phrases shall have the meanings respectively ascribed to them by this section:

ABANDONMENT — The cessation of a nonconforming use or structure as indicated by the visible or otherwise indicated intention to discontinue a nonconforming use of a structure or a lot, or the cessation of a nonconforming use or structure by its replacement with a conforming use or structure.

ACCESSORY BUILDING — A subordinate building, located on the same lot as the main, or principal building or principal use, the use of which is customarily incidental to the main or principal use permitted in the district.

ACCESSORY USE — A use customarily incidental to that of the main or principal building or use of the land.

ADEQUATE CAPACITY — Capacity is considered to be adequate if the grade of service is p. 05 or better for a worst-case day in a preceding month, based on the Erllang B Tables, prior to the date of application; or as measured using direct traffic measurement of the personal wireless service facility in question for existing facilities requesting major modification and where the call blocking is due to frequency contention at the antenna(s).

1. **Editor's Note: See Ch. 82, Building Construction.**
2. **Editor's Note: See Ch. 159, Subdivision of Land.**

ADEQUATE COVERAGE — Coverage is considered to be adequate within that area surrounding a base station where the predicted or measured median field strength of the transmitted signal for at least 75% of the covered area is greater than -95 dbm. It is acceptable for there to be holes within the area of adequate coverage where the signal is less than -95 dbm, as long as the signal regains its strength to greater than -95 dbm further away from the base station. For the limited purpose of determining whether the use of a repeater is necessary or desirable, there shall be deemed not to be adequate coverage within said holes. The outer boundary of the area of adequate coverage, however, is that location past which the signal does not regain a strength of greater than -95 dbm.

ADULT DAY-CARE FACILITY — A building or structure where care, protection, and supervision are provided, on a regular schedule, to adults over the age of 18.

AGRICULTURE — The production, keeping or maintenance, for sale or lease, of plants and animals useful to man, including but not limited to: forages and sod crops; grains and seed crops; dairy animals and dairy products; poultry and poultry products; livestock, including beef cattle, swine, horses, mules, ponies, or goats or any mutations of hybrids thereof, including the breeding and grazing of any or all such animals, bees, and apiary products, for animals, trees and forest products; fruits of all kinds, including grapes, nuts and berries, vegetables, floral, nursery, ornamental and greenhouse products; or lands devoted to a soil conservation or forestry management program.

ALTERATION — Any construction, reconstruction or other action resulting in a change in the structural parts, height, number of stories, exits, size, use or location of a building or other structure.

AMUSEMENT PARK — A commercially operated park with a predominance of outdoor games and activities for entertainment, including shows or riding devices, games of skill or chance, or any combination of shows, riding devices, water slides, miniature golf, batting cages or any combination of several enterprises, such as revolving wheels, merry-go-rounds, giant swings, panoramas, musical and theatrical entertainments, or riding devices, whether carried on, engaged in or conducted as one enterprise or by several concessionaries, and whether an admission fee is charged for admission to all such shows for entertainment, or a separate fee for admission is charged for each amusement.

ANIMAL CLINIC OR HOSPITAL — A place where animals or pets are given medical or surgical treatment, and the boarding of animals is limited to short-term care incidental to the clinic or hospital use.

ANTENNA — A device which is attached to a tower or other structure for transmitting and receiving electromagnetic waves.

APARTMENT HOUSE — A building or structure arranged, intended and designed to be occupied by two to eight families, living independently of each other, and each including its own separate kitchen and bathroom accommodations. Garden-type apartments shall be considered as an apartment house.

ATTIC — The unfinished space between the ceiling of the top story of a building and its roof which is not used for living, sleeping or eating quarters.

BASE STATION — The primary sending and receiving site in a wireless telecommunications network.

BUILDING — A structure enclosed within exterior walls or firewalls, built, erected and framed of a combination of any materials, whether portable or fixed, having a roof, to form

a structure for the shelter of persons, animals or property. For the purpose of this definition, "roof" shall include an awning or any similar covering, whether or not permanent in nature. The word "building" shall be construed, where the context requires, as though followed by words "or part or parts thereof." A porch or an attached garage, greenhouse or similar structure is to be considered as part of a building when considering the requirements of setback, side or rear yards.

BUSINESS — The transacting or carrying on of a trade or commercial enterprise with a view to profit or for livelihood.

CEMETERY — Land used or intended to be used for the burial of the dead and dedicated for cemetery purposes, including columbariums, crematoriums, mausoleums, and funeral establishments, when operated in conjunction with and within the boundary of such cemetery under the care and supervision of the Town or other public authority.

CHANNEL — The segment of the radiation spectrum from an antenna which carries one signal. An antenna may radiate on many channels simultaneously.

CHILD-CARE FACILITY — Facilities that serve children under seven years of age, or 16 years if the children have special needs, or school-age children (under 14 years of age or 16 years if they have special needs), in programs that are held before or after school hours or during vacations. A child-care facility defined in MGL c. 28A, § 9.

CLUB OR LODGE, PRIVATE — Buildings, structures and premises used by a nonprofit social or civic organization or by a nonprofit organization, catering exclusively to members and their guests for social, civic, recreation, or athletic purposes which are not conducted primarily for gain and provided there are no vending stands, merchandising, or commercial activities except as may be required generally for the membership and purposes of such organization.

COMMERCIAL RECREATION, INDOORS — A structure for recreational, social or amusement purposes, which may include as an accessory use the consumption of food and drink, including all connected rooms or space with a common means of egress and entrance. Places of assembly shall include theaters, concert halls, dance halls, skating rinks, bowling alleys, health clubs, dance studios, or other commercial recreational centers conducted for or not for profit.

COMMERCIAL RECREATION, OUTDOORS — Driving range, bathing beach, sports club, horseback-riding stable, boathouse, marina or other commercial recreation carried on, in whole or in part, outdoors, except those activities more specifically designated in this chapter.

COMMUNICATION EQUIPMENT SHELTER — A structure located at a base station designed principally to enclose equipment used in connection with personal wireless service transmissions.

CONVENIENCE STORE — A retail store that sells groceries and may also sell gasoline; does not include automotive service stations or vehicle repair shops.

CREMATORY — A building containing a furnace designed and intended to be used for cremating the dead and owned and controlled by a cemetery corporation or crematory corporation duly organized under the laws of the state.

DBM — Unit of measure of the power level of an electromagnetic signal expressed in decibels referenced to one milliwatt.

DETACHED — Separate from.

DEVELOPMENT — Any man-made change to improved or unimproved real estate, including but not limited to building or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

DWELLING — A building designed and occupied as the living quarters of one or more families. Single- and two-family dwellings shall be designed for and occupied by not more than one or two families, respectively. A multifamily dwelling shall be one designed for and occupied by two or more families. Hotels, lodging houses, hospitals, membership clubs, or dormitories shall not be considered dwellings.

EARTH REMOVAL — Extraction of sand, gravel, topsoil, or other earth for sale or for use at a site removed from the place of extraction, exclusive of the grading of a lot preparatory to the construction of a building for which a building permit has been issued or the grading of streets in accordance with an approved definitive plan, and exclusive of granite operations.

EDUCATIONAL USE — Use of land or structures for education purposes on land owned or leased by the commonwealth or any of its agencies, subdivisions or bodies politic or by a religious sect or denomination or by a nonprofit education corporation. Educational facilities not exempted from regulation by MGL c. 40A, § 3.

EMF — Electromagnetic frequency radiation.

ERECT — To build, construct, reconstruct, move upon, or conduct any physical development of the premises required for a building; to excavate, fill, drain, and the like preparation for building shall also be considered to erect.

ESSENTIAL SERVICES — Services provided by a public service corporation or by governmental agencies through erection, construction, alteration, or maintenance of gas, electrical, steam, or water transmission or distribution systems and collection, communication, supply, or disposal systems, whether underground or overhead, but not including wireless communications facilities. Facilities necessary for the provision of essential services include poles, wires, drains, sewers, pipes, conduits, cables, fire alarm boxes, police call boxes, traffic signals, hydrants and other similar equipment in connection therewith.

FACILITY SITE — The location within a Wireless Telecommunications Overlay District leased by one or more personal wireless service providers and upon which one or more personal wireless service facility(ies) and required landscaping are located.

FAMILY — A number of individuals related by blood, marriage and/or adoption or a group of unrelated individuals, not to exceed four, who are occupying a dwelling unit and living as a single nonprofit housekeeping unit. This definition, however, does not apply to nonrelated disabled persons as defined by any applicable federal and/or state law and/or regulations.

FAMILY DAY-CARE FACILITY — Any private residence which on a regular basis receives for temporary custody and care, during part or all of the day, children under seven years of age or children under 16 years of age if such children have special needs; provided, however, in either case, that the total number of children shall not exceed more than six, excluding participating children living in the residence.

FARMSTAND — A facility for the sale of produce, and wine and dairy products, provided that during the months of June, July, August, and September of every year, or during the

harvest season of the primary crop raised on land of the owner or lessee, the majority of such products for sale, based on either gross sales dollars or volume, have been produced

by the owner or lessee of land containing more than five acres on which the facility is located, used primarily for agriculture in conformance with MGL c. 40A, § 3.

FCC — Federal Communications Commission. The government agency responsible for regulating telecommunications in the United States.

FCC 96-326 — A report and order which sets new national standards for emissions of radio frequency emissions from FCC-regulated transmitters.

FENCE — An artificially constructed barrier of any material or combination of materials erected to enclose or screen areas of land.

FLOOD or FLOODING — A general and temporary condition of partial or complete inundation of normally dry land areas from:

(1) The overflow of inland or tidal waters;

(2) The unusual and rapid accumulation or runoff of surface waters from any source.

~~FLOOD BOUNDARY AND FLOODWAY MAP — An official map of a community issued by FEMA that depicts, based on detailed analyses, the boundaries of the 100-year and 500-year floods and the 100-year floodway. (For maps done in 1987 and later, the floodway designation is included on the FIRM.)~~

FLOODWAY — The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot.

FUNCTIONALLY DEPENDENT USE — A use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but does not include long-term storage or related manufacturing facilities.

GARAGE, PRIVATE — A building or space used as an accessory to or a part of a main building permitted in any residential district, and providing for the storage of one or more motor vehicles and in which no business, occupation or service for profit is in any way conducted.

GARAGE, PUBLIC — A garage, other than a private or storage garage, which is used for the short-term parking of vehicles.

GARAGE, REPAIR — A building or portion thereof, other than a private or storage garage, designed or used for equipping, servicing, repairing, hiring, selling, and/or storing of motor vehicles. The term "repairing" shall not include an automobile body repair shop nor the rebuilding, dismantling, or storage of wrecked or junked vehicles.

GASOLINE SERVICE STATION — A gasoline service station shall include any business selling or offering for sale any motor fuel, such as gasoline or diesel fuel, to the public, whether or not the public is permitted or expected to operate the pump to put the fuel into a motor vehicle's fuel tank or a container, and shall include gasoline filling stations and gasoline self-service stations. For the purposes of this chapter, "gasoline service station" shall also include any site used or operated as a retail refueling site, including the fuels of gasoline, propane, electricity and hydrogen.

GHZ — Gigahertz: one billion hertz.

Commented [DJ(1]: Agawam only has FIRMs

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Deleted: FLOODWAY FRINGE — The land in the floodplain within a community subject to a one-percent-or-greater chance of flooding in a given year that is located outside of the floodway.¶

GRADE OF SERVICE — A measure of the percentage of calls which are able to connect to the base station during the busiest hour of the day. Grade of service is expressed as a number, such as p. 05, which means that 95% of callers will connect on their first try. A lower number (p. 04) indicates a better grade of service.

HALF STORY — The space between the ceiling of the top story of a building and the roof where the area and height are sufficient for sleeping and living quarters.

HAZARDOUS MATERIAL — Any substance which is listed in, but not limited to, the EPA priority pollutants as described in Section 307(a) of the Clean Water Act, as amended.

HEIGHT — The vertical distance from the average finished grade of the adjacent ground to the top of the structure of the highest roof beams of a flat roof, or the mean level of the highest gable or slope of a hip roof.

HERTZ — One hertz is the frequency of an electric or magnetic field which reverses polarity once each second or one cycle per second.

HIGHEST ADJACENT GRADE — The highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

HISTORIC STRUCTURE — Any structure that is:

(a) Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;

(b) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;

(c) Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior; or

(d) Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either: (1) By an approved state program as determined by the Secretary of the Interior or(2) Directly by the Secretary of the Interior in states without approved programs.

HOME OCCUPATION — An occupation, business, trade, service or profession which is incidental to and conducted in a dwelling unit or in a building or other accessory structure thereto, by a resident thereof.

HOSPITAL — An institution providing primary health services and medical or surgical care to persons, primarily inpatients, suffering from illness, disease, injury, deformity and other abnormal physical or mental conditions, and including, as an integral part of the institution related facilities such as laboratories, outpatient facilities or training facilities, a sanitarium, and clinic. The term "hospital" does not include a rest home, nursing home and/or convalescent home.

HOUSEKEEPING UNIT — See definition of "family."

JUNK VEHICLE — A wrecked, damaged, destroyed, nonoperational, abandoned or disassembled trailer, house trailer, boat, tractor, automobile, aircraft, or other motor vehicle, or any parts thereof. A junk vehicle includes apparently inoperable, immobile, disassembled or extensively damaged vehicles. Evidence of nonoperation and damage includes, but is not limited to, a buildup of debris that obstructs use, a broken window or windshield, a missing wheel, a flat tire, a nonfunctional motor or transmission, missing bumpers, or missing plates and the like.

KENNEL, COMMERCIAL — An establishment licensed to operate a facility housing dogs, cats, or other household pets and where grooming, breeding, boarding, training or selling of animals is conducted as a business.

KENNEL, PRIVATE — Any building or land designated or arranged for the care of dogs, cats or other household pets belonging to the owner of the residential, principal use, kept

for purposes of show, hunting, or as pets.

LODGING HOUSE — A building containing more than five lodging units for semipermanent residence (longer than one week) for compensation and which meals may also be supplied as part of the fee. This shall not include bed-and-breakfast home uses, congregate housing, motels, hotels, multifamily dwellings, or nursing homes.

LIGHT MANUFACTURING — Fabrication, assembly, processing, finishing work or packaging.

LOADING SPACE, OFF-STREET — Space located on the same lot with a principal building, or contiguous to a group of buildings, for bulk pickups and deliveries, scaled to delivery vehicles expected to be used, and accessible to such vehicles when required off-street parking spaces are filled. It shall abut a street, alley, or other appropriate means of ingress or egress.

LOT — A continuous parcel of land with legally definable boundaries.

LOT, AREA — The horizontal area of the lot exclusive of any area in a street or recorded way open to public use.

LOT, CORNER — A lot located at the intersection of two or more streets.

LOT, DEPTH OF — The mean distance from the street line of the lot to its opposite rear line measured in the general direction of the side lines of the lot.

LOT, FRONTAGE OF — A lot line coinciding with the sideline of a street which provides legal rights of vehicular access and actual physical vehicular access to the lot. Frontage shall be measured continuously along a street and shall be the horizontal distance between the side lot lines measured at the point where the side lot lines intersect with the front setback line. Lots adjacent to paper streets may not use any portion of the paper street in calculating frontage or lot area.

LOT LINE — A line dividing one lot from another, or from a street or any public place.

LOT LINE, REAR — The lot line opposite the street line, except that, in the case of a corner lot, the rear lot line shall be the line opposite the street line on which the building is numbered or would be numbered.

MAJOR MODIFICATION OF AN EXISTING FACILITY — Any change or proposed change in power input or output, number of antennas, change in antenna type or model, repositioning of antenna(s), change in number of channels per antenna above the maximum number approved under an existing special permit. Also any increase or proposed increase in dimensions of an existing and permitted tower or other structure designed to support personal wireless service transmissions, receiving and/or relaying antennas and/or equipment.

MEDICAL CENTER OR CLINIC — A building designed and used for the diagnosis and treatment of human patients that does not include overnight care facilities.

MHZ — Megahertz: one million hertz.

MILE — A mile (5,280 feet) is to be measured from a point on an imaginary line which is perpendicular to the vertical line at that point.

MONITORING — The measurement, by the use of instruments in the field, of the radiation from a site as a whole or from individual personal wireless service facilities, towers or antennas.

MONITORING PROTOCOL — The testing protocol, initially the Cobbs Protocol, which is to be used to monitor the emissions from existing and new personal wireless service facilities and towers upon adoption of this chapter. The SPGA may, as the technology changes, require, by written regulation, the use of other testing protocols. A copy of the monitoring protocol shall be on file with the Town Clerk.

MONOPOLE — A single self-supporting vertical pole with below-grade foundations.

MOUNT — The structure or surface upon which antennas are mounted, including the following four types of mounts:

(1) Roof-mounted: mounted on the roof of a building.

(2) Side-mounted: mounted on the side of a building.

(3) Ground-mounted: mounted on the ground.

(4) Structure-mounted: mounted on a structure other than a building.

MOTEL — A building or buildings intended and designed for transient overnight or extended occupancy, divided into separate units within the same building, with or without a public dining facility.

MOTOR VEHICLE COMMERCIAL — Any vehicle used or designed to be used for business or commercial purposes that infringes on the residential character of residential districts and includes, but is not necessarily limited to, a bus, cement truck, commercial tree-trimming equipment, construction equipment, dump truck, garbage truck, panel truck, semitractor, semitrailer, stake bed truck, step van, tank truck, tar truck, fire truck, or the like, or other commercial-type vehicle licensed by the state as a commercial vehicle or truck.

MOTOR VEHICLE GENERAL OR BODY REPAIR — An establishment, garage or work area enclosed within a building where repairs are made or caused to be made to motor vehicles and their bodies, including fenders, bumpers and similar components of motor vehicle bodies, but does not include the storage of vehicles for the cannibalization of parts or fuel sales.

MUNICIPAL FACILITIES — Facilities owned or operated by the Town of Agawam.

NEW CONSTRUCTION — Structures for which the start of construction commenced on or after the effective date of the first floodplain management code, regulation, ordinance, or standard adopted by the authority having jurisdiction, including any subsequent improvements to such structures. New construction includes work determined to be substantial improvement.

NONCONFORMING BUILDING OR STRUCTURE — A building or structure, existing at the effective date of this chapter, or any subsequent amendment thereto, which does not conform to one or more provisions of this chapter.

NONCONFORMING LOT — A lot lawfully existing at the effective date of this chapter, or any subsequent amendment thereto, which is not in accordance with all the provisions of this chapter.

NONCONFORMING USE — A use lawfully existing at the time of adoption of this chapter, or any subsequent amendment thereto, which does not conform to one or more provisions of this chapter.

NURSING, REST HOME OR CONVALESCENT HOME — An extended or intermediate care facility licensed or approved to provide full-time convalescent or chronic care to individuals who, by reason of advanced age, chronic illness or infirmity, are unable to care for themselves.

OFF-SITE MEDICAL MARIJUANA DISPENSARY (OMMD) — A registered marijuana dispensary that is located off site from the cultivation/processing facility (and controlled and operated by the same registered and approved not-for-profit entity which operates an affiliated RMD) but which serves only to dispense the processed marijuana, related supplies and educational materials to registered qualifying patients or their personal caregivers in accordance with the provisions of 105 CMR 725.00.**[Added 5-5-2014 by TOR-2014-1]**

OFF-STREET PARKING SPACE — A space of 200 square feet or more plus access and maneuvering space, whether inside or outside a structure, for exclusive use as a parking stall for one motor vehicle, and further being surfaced with durable pavement.

OPEN SPACE — The space on a lot unoccupied by buildings, structures, driveways, off-street parking or loading spaces or other impervious surfaces.

ORDINARY HIGH-WATER MARK — The highest point on the bank of a floodway or floodplain at which the water level has been for a sufficient period of time to leave a definite mark.

Commented [ES2]: Is this needed?

Commented [DJ(3R2)]: Not for NFIP regs… maybe this is here for Wetlands Protection Act work? Ask the con comm if they use Ordinary High Water (OHW)

PERSONAL WIRELESS SERVICES — Commercial mobile services, unlicensed wireless services and common carrier wireless exchange access services. These services include cellular services, personal communications services (PCS), specialized mobile radio services and paging services.

PERSONAL WIRELESS SERVICE FACILITY — All equipment (excluding any repeaters) with which a personal wireless service provider broadcasts and receives the radio frequency waves which carry their services and all locations of said equipment or any part thereof. This facility may be sited on one or more towers or structures(s) owned and permitted by another owner or entity.

PERSONAL WIRELESS SERVICE PROVIDER — An entity licensed by the FCC to provide personal wireless services to individuals or institutions.

PRINCIPAL BUILDING — A building in which is conducted the principal use of the lot on which it is located.

PRINCIPAL USE — The main or primary purpose for which a structure or lot is designed, arranged or intended, or for which it may be used, occupied or maintained under this chapter. Any other use within the main structure or the use of any other structure or land on the same lot and incidental or supplementary to the principal use and permitted under this chapter shall be considered an accessory use.

RADIATION PROPAGATION STUDIES OR RADIAL PLOTS — Computer-generated estimates of the radiation emanating from antennas or repeaters sited on a specific tower or structure. The height above mean sea level, power input and output, frequency output, type of antenna, antenna gain, topography of the site and its surroundings are all taken into account to create these simulations. They are the primary tool for determining whether a site will provide adequate coverage for the personal wireless service facility proposed for that site.

REAR YARD — The required unoccupied space or area within the rear lot line and the part of the principal building nearest such rear lot line.

RECREATIONAL VEHICLE means a vehicle which is:

a. Built on a single chassis;

b. 400 square feet or less when measured at the largest horizontal projection;

c. Designed to be self-propelled or permanently towable by a light duty truck; and

d. Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

REGISTERED MARIJUANA DISPENSARY (RMD) — A use operated by a not-for-profit entity registered and approved by the Massachusetts Department of Public Health in accordance with 105 CMR 725.000, and pursuant to all other applicable state laws and regulations, also to be known as a "medical marijuana treatment center," that acquires, cultivates, possesses, processes (including development of related products such as food, tinctures, aerosols, oils, or ointments), transfers, transports, sells, distributes, dispenses, or administers marijuana, products containing marijuana, related supplies, or educational materials to registered qualifying patients or their personal caregivers. An RMD shall

explicitly include facilities which cultivate and process medical marijuana and which may also dispense and deliver medical marijuana and related products. The cultivation and processing of medical marijuana in accordance with these regulations is considered to be a manufacturing use and is not agriculturally exempt from zoning.**[Added 5-5-2014 by TOR-2014-1]**

RESTAURANT — A building, or portion thereof, which is designed, intended and used for the indoor sales and consumption of food prepared on the premises, except that food

may be consumed outdoors in landscaped terraces, designed for dining purposes, which are adjuncts to the main indoor restaurant facility. The term "restaurant" shall not include "fast-food establishments."

RESTAURANT, FAST-FOOD — An establishment engaged primarily in the business of preparing food and purveying it on a self-service or semi-self-service basis. Customer orders and/or service may be by means of a walk-up counter or window designed to accommodate automobile traffic. Consumption is either on or off the premises.

RESTAURANT, DRIVE-IN AND DRIVE-THROUGH — A restaurant which provides convenient vehicular access and may provide service to customers while in their vehicles.

SANITARIUM — A hospital used for treating chronic and usually long-term illness.

SEMIDETACHED DWELLING — A single-family residential unit that is joined on one side to another single-family residential unit having a party wall between the units.

SERVICES, PROFESSIONAL — Establishments primarily engaged in rendering services by professional persons on a fee or contract basis, including, but not limited to, the following: accounting, auditing, and bookkeeping; medical, dental or health; planning, engineering and architectural; education and science; attorneys and notary publics; etc.

SETBACK — The minimum required unoccupied space or area between the street line of which the building is numbered or would be numbered and the part of the building nearest such street line, such unoccupied space or area extending the entire width or distance across the lot.

SIDE LOT LINE — The line dividing one lot from another.

SIDE YARD — The required unoccupied space and area within the lot between the side lot line and parts of the building nearest such side lot line. In the case of a corner lot, one of the side yards shall be the unoccupied space or area between the street line of the side street and the parts of the building nearest to such street line.

SIGN — Any device, surface or framework on which words, symbols or other designs are inscribed or displayed and designed to call attention thereto, including flags, banners and the like.

SIGN, ACCESSORY — Any sign that advertises or indicates the person occupying the premises on which the sign is erected or maintained or the business transacted thereon or the products sold thereon.

SIGN, AREA OF —

(1) Area of the face. The area of the face of a sign shall be considered to include all lettering, working and accompanying designs and symbols, together with the background on which they are displayed and any cutouts or extensions.

(2) The area of a sign consisting of individual letters or symbols attached to or painted on a surface, building, wall or window shall be considered to be that of the smallest quadrangle or triangle which encompasses all the letters and symbols.

(3) The area of a sign consisting of a three-dimensional object shall be considered to be the area of the largest vertical cross section of that object.

(4) In computing the area of the signs, both sides of V-shaped signs, but only one side of the back-to-back signs, shall be counted.

SIGN, BILLBOARD — Any nonaccessory sign greater in face area than 40 square feet.

SIGN, COLOR — The color concept of the sign shall be such that it does not violate the purpose of this chapter.

SIGN, INSTRUCTIONAL — Signs indicating "entrance," "exit" or the like, erected on premises for the direction of persons or vehicles.

SIGN, OUTDOOR ADVERTISING BOARD — The Outdoor Advertising Board of the Commonwealth or any board or official which may hereafter succeed to its powers or functions.

SIGN, OVERHANGING — A sign or other advertising device which hangs or extends over a sidewalk or a way in which the public has a right of access. Wall signs and standing signs shall not be included in this definition.

SIGN, REAL ESTATE — A sign advertising the sale, rental or lease of the premises on which it is maintained.

SIGN, STANDING — A sign standing or hanging free on its own support; such support may be attached to a building or fixed in or to the ground. Standing signs may have two faces or sides showing in opposite directions.

SIGN, STRUCTURE — The supports, uprights, bracing and framework of a sign. Any color applied to the "structure" shall meet the purposes of this chapter.

SIGN, TEMPORARY — Any sign, including its supporting structure, intended to be maintained for a period less than 180 days for agricultural purposes and 60 days for any other purposes.

SIGN, WALL — A sign fastened or affixed parallel to and within 12 inches of the wall of a building.

SIGN, WINDOW — A sign painted or placed on the inside or outside of a window.

SINGLE-FAMILY DWELLING — A structure designed exclusively for and occupied exclusively by one family.

SITE PLAN — A plan, to scale, showing uses and structures proposed for a parcel of land as required by the zoning regulations, including lot lines, streets, building sites, buildings, landscape features, traffic circulation, parking, drainage, utilities, signs, topography and lighting within the parcel.

SPECIAL FLOOD HAZARD AREA — The land area subject to flood hazards and shown on a Flood Insurance Rate Map or other flood hazard map as Zone A, AE, A1-30, A99, AR, AO, or AH.

SPECIAL PERMIT GRANTING AUTHORITY — The Board of Appeals of the Town of Agawam.

START OF CONSTRUCTION — The date of issuance for new construction and substantial improvements to existing structures, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement or other improvement is within 180 days after the date of issuance. The actual start of construction means the first placement of permanent construction of a building (including a manufactured home) on a site, such as the pouring of a slab or footings, installation of pilings or construction of columns.

Permanent construction does not include land preparation (such as clearing, excavation,

grading or filling), the installation of streets or walkways, excavation for a basement, footings, piers or foundations, the erection of temporary forms or the installation of accessory buildings such as garages or sheds not occupied as dwelling units or not part of the main building. For a substantial improvement, the actual "start of construction" means the first alteration of any wall, ceiling, floor or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

STORAGE CAPACITY OF A FLOODPLAIN — The volume of space above an area of floodplain that can be occupied by floodwater of a given stage at a given time, regardless of whether the water is moving.

STORY — The horizontal portion through a building between floor and ceiling. The word "story" shall not include the portion of the basement or cellar of a building above grade or an attic as defined in this section.

STREET — An accepted Town way, or a way established by or maintained under county, state, or federal authority, or a way established by a subdivision plan approved in accordance with the Subdivision Control Law,[3] actually constructed to specifications or for which adequate security exists to construct such a way.

STREET LINE — The dividing line between a street and a lot and, in the case of a public way, the street line established by the public authority laying out such way upon which the lot abuts.

STREET, PAPER — A street shown on a recorded plan but never built on the ground.

STREET RIGHT-OF-WAY — A general term denoting land, property or interest therein, usually a strip acquired for or devoted to a planned roadway. A street right-of-way should be sufficient to accommodate the ultimate roadway, including, but not limited to, the street pavement, shoulder, grass strip, sidewalk, public utility facilities, street trees, and snow storage.

STRUCTURE — A combination of materials assembled at a fixed location to give support or shelter, such as a building, framework, retaining wall, tent, reviewing stand, platform, bin fence, sign, flagpole, recreational tramway, and mast for radio antenna or the like. The word "structure" shall be construed, where the context allows, as though followed by the words "or part or parts thereof." STRUCTURE means, for floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured home.

SUBSTANTIAL IMPROVEMENT IN THE FLOODPLAIN — Any repair, reconstruction or improvement of a structure, the cost of which equals or exceeds 50% of the assessed value of the structure either before the improvement is started or, if the structure has been damaged and is being restored, before the damage occurred. Substantial improvement is started when the first alteration of any structural part of the building commences.

SUBSTANTIAL REPAIR OF A FOUNDATION — When work to repair or replace a foundation results in the repair or replacement of a portion of the foundation with a perimeter along the base of the foundation that equals or exceeds 50% of the perimeter of the base of the foundation measured in linear feet, or repair or replacement of 50% of the piles, columns or piers of a pile, column or pier supported foundation, the building official shall determine it to be substantial repair of a foundation. Applications determined by the building official to constitute substantial repair of a foundation shall require all existing portions of the entire building or structure to meet the requirements of 780 CMR.

TOWER — A monopole that is designed to support personal wireless service transmission, receiving and/or relaying antennas and/or equipment.

TRAILER — Any so-called automobile trailer, mobile home or trailer coach, including any portable structure, means of conveyance or vehicle so designed or constructed, altered or converted in any manner as to permit occupancy thereof for dwelling or sleeping purposes.

TRUCKING TERMINAL — Terminal facilities for handling freight, with or without maintenance facilities.

UNREGISTERED MOTOR VEHICLES — Any motor vehicle or trailer not registered in accordance with Massachusetts General Laws Chapter 90, or any motor vehicle which fails to carry or display its license plate as provided in § 6 of said Chapter 90; or any motor vehicle or trailer owned by a nonresident who has failed to comply with the registration laws of the nonresident state or country.

USE, SUBSTANTIALLY DIFFERENT — A use which by reason of its normal operation would cause readily observable differences in patronage, service, sight, noise, employment or similar characteristics from the use to which it is being compared.

VARIANCE — A grant of relief by a community from the terms of a flood plain management

regulation.

VIOLATION — The failure of a structure or other development to be fully compliant with the community's flood plain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in §60.3(b)(5), (c)(4), (c)(10), (d)(3), (e)(2), (e)(4), or (e)(5) is presumed to be in violation until such time as that documentation is provided.

WIRELESS TELECOMMUNICATIONS OVERLAY DISTRICT (WTOD) — Specific area(s), determined by engineering analysis to contain sites where adequate service may be provided to the Town of Agawam, which, at the same time, have the potential of reducing or mitigating negative impacts in accordance with the overlay district as defined in this chapter.

YARD — A space open to the sky, located between a building or structure and a lot line, unoccupied except by fences, walls, poles, paving, and other customary yard accessories.

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3. **Editor's Note: See MGL c. 41, § 81K et seq.**

YARD, FRONT — A yard extending the full width of the lot and situated between the street line and nearest point of the building.

YARD, REAR — The required unoccupied space or area within the rear lot line and the part of the principal building nearest such rear lot line.

YARD, SIDE — The required unoccupied space or area within the lot between the side lot line and parts of the building nearest such side lot line. In the case of a corner lot, one of the side yards shall be the unoccupied space or area between the street line of the side street and the parts of the building nearest to such street line.

§ 180-3. Districts enumerated; Building Zone Map.

A. For the purpose of this chapter, the Town shall be divided into 13 classes of districts as follows: **[Amended 4-3-2006 by TR-2006-9; 8-12-2013 by TOR-2013-6; 6-2-2014 by TOR-2014-4]**

Residence A-1 Districts

Residence A-2 Districts

Residence A-3 Districts

Residence A-4 Districts

Residence A-5 Age-Restricted Housing District

Residence A-6 Low-Density Multifamily Community District

Residence B Districts

Agriculture Districts

Business A Districts

Business B Districts

Mixed-Use Business C District

Industrial District A

Industrial District B

B. The boundaries of each district area hereby established as shown on the building zone map entitled: "Town of Agawam, Building Zone Map" one inch equals 800 feet and dated effective 1960, revised September 7, 2006, which is hereby declared to be a part of this chapter. Such shall be hereinafter referred to as the "Building Zone Map."[4] **[Amended 5-21-2007 by TOR-2007-4]**

§ 180-4. Filing of plans.

Unless otherwise ordered by the Inspector of Buildings, all applications for building permits under the provisions of the Building Code[5] of the Town shall be accompanied by plans in duplicate. Such plans shall be drawn to scale, shall show the actual dimensions, radii and angles of the lot to be built upon, the exact size and location on the lot of the main building and accessory buildings to be erected and such other information as may be amended. One copy

4. **Editor's Note: The Building Zone Map is included as an attachment to this chapter..**

5. **Editor's Note: See Ch. 82, Building Construction.**

ARTICLE XII

Floodplain Zone
[Added 1-30-1978; amended 6-18-2013 by TOR-2013-5]

§ 180-67. Purpose.

The Floodplain Zone and the regulations herein have been established for the following purposes:

1. To protect and preserve the watercourses and their adjoining floodplain;
2. To ensure public safety through reducing the threats to life and personal injury
3. To eliminate new hazards to emergency response officials
4. To prevent the occurrence of public emergencies resulting from water quality, contamination, and pollution due to flooding
5. To avoid the loss of utility services which if damaged by flooding would disrupt or shut down the utility network and impact regions of the community beyond the site of flooding
6.
7. To protect the public from the burden of extraordinary financial expenditures for flood response and cleanup; and
8. To reduce damage to public and private property resulting from flooding waters
9. To protect the capacity of the floodplain to absorb, transmit and store runoff to assure retention of sufficient floodway area to convey flows which can reasonably be expected to occur.

§ 180-68. Maps; use of other base flood elevation data.

A. The Floodplain District is herein established as an overlay district. The District includes all special flood hazard areas designated on the Hampden County Flood Insurance Rate Map (FIRM) issued by the Federal Emergency Management Agency for the administration of the National Flood Insurance Program, dated September 17, 2014. This map indicate the 1%-chance regulatory floodplain. The exact boundaries of the District shall be defined by the 1%-chance base flood elevations shown on the FIRM and further defined by the Flood Insurance Study (FIS) report dated September 17, 2014. The effective FIRM and FIS report are incorporated herein by reference and are on file with the Building Department. The effective FIRM and FIS report are incorporated herein by reference and are on file in the Building Department.

B. In Zone A areas where base flood elevation data is not provided by the Flood Insurance Study, other available data from federal, state or other sources shall be utilized as a basis of determining the base flood level for purposes of enforcing the provisions of this article.

§ 180-xx. Abrogation and greater restriction

The floodplain management regulations found in this Floodplain Overlay District section shall

Deleted: to

Deleted: to reduce the hazards of floods upon the public health, safety and general welfare; …

Commented [DJ(4]: Current map date is actually September 17, 2014, since we use the map index panel date for this.

Deleted: The District includes all special flood hazard areas within the Town of Agawam designated as Zone A or AE on the Hampden County Flood Insurance Rate Map (FIRM) issued by the Federal Emergency Management Agency (FEMA) for the administration of the National Flood Insurance Program. The map panels of the Hampden County FIRM that are wholly or partially within the Town of Agawam are Panel Nos. 25013C0377E, 25013C0379E, 25013C0381E, 25013C0382E, 25013C0383E, 25013C0384E, 25013C0387E, 25013C0391E, 25013C0392E, 25013C0401E, 25013C0403E, 25013C0404E, 25013C0411E, and 25013C0413E, dated July 16, 2013. The exact boundaries of the district may be defined by the one-hundred-year base flood elevations shown on the FIRM and further defined by the Hampden County Flood Insurance Study (FIS) report dated July 16, 2013.…

Commented [ES5]: Once new maps are complete, review language to affirm map inventory, and update date of FIS, once new maps have been furnished. Confirm products are on file at building department.

Commented [DJ(6R5]: FEMA is no longer requiring panel numbers; these can and should be removed permanently.

take precedence over any less restrictive conflicting local laws, ordinances or codes.

§ 180-xx. Disclaimer of liability

The degree of flood protection required by this bylaw [ordinance] is considered reasonable but does not imply total flood protection.

§ 180-xx. Designation of community Floodplain Administrator

The Town of Agawam hereby designates the position of Building Inspector to be the official floodplain administrator for the Town/City.

§ 180-xx. Requirement to submit new technical data

If the Town acquires data that changes the base flood elevation in the FEMA mapped Special Flood Hazard Areas, the Town will, within 6 months, notify FEMA of these changes by submitting the technical or scientific data that supports the change(s.) Notification shall be submitted to:

FEMA Region I Risk Analysis Branch Chief, 99 High St., 6th floor, Boston, MA 02110

And copy of notification to:

Massachusetts NFIP State Coordinator, MA Dept. of Conservation & Recreation, 251 Causeway Street, Boston, MA 02114

§ 180-xx. Variances to building code floodplain standards

The Town will request from the State Building Code Appeals Board a written and/or audible copy of the portion of the hearing related to the variance, and will maintain this record in the community's files.

The Town shall also issue a letter to the property owner regarding potential impacts to the annual premiums for the flood insurance policy covering that property, in writing over the signature of a community official that (i) the issuance of a variance to construct a structure below the base flood level will result in increased premium rates for flood insurance up to amounts as high as $25 for $100 of insurance coverage and (ii) such construction below the base flood level increases risks to life and property. Such notification shall be maintained with the record of all variance actions for the referenced development in the floodplain overlay district.

§ 180-xx. Variances to local Zoning Bylaws related to community compliance with the National Flood Insurance Program (NFIP)

A variance from this floodplain overlay bylaw must meet the requirements set out by State law, and may only be granted if all of the following conditions are met:

1) good and sufficient cause and exceptional non-financial hardship exist;

2) the variance will not result in additional threats to public safety, extraordinary public expense, or fraud or victimization of the public; and

3) the variance is the minimum action necessary to afford relief.

§ 180-69. Permitted uses.

In those portions of the Town so designated in § 180-68, the following uses of land shall be permitted, provided that all necessary state or federal permits are obtained:

A. Conservation of water, plants and wildlife.

B. Legally permitted outdoor recreation not requiring development or landscape alteration in conflict with the purpose of this zone.

C. Grazing, forestry and other farms or agriculture consistent with the purposes of the zone.

D. Dwellings lawfully existing prior to the adoption of these provisions; however, no building permits for substantial improvements or extensions shall be granted unless a special permit is granted by the Board of Appeals.

E. Proper operation and maintenance of dams and other water control devices.

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F. Construction and maintenance of highways, streets, sidewalks, sewers, water mains, storm drains, utilities and related facilities by governmental agencies, provided that the water and sewer systems and utilities be designed and constructed to minimize flood damage and to minimize or eliminate infiltration of floodwater into the systems and discharges from the systems into floodwaters.

G. In A1-30, AH, and AE Zones, all recreational vehicles to be placed on a site must be elevated and anchored in accordance with the zone's regulations for foundation and elevation requirements or be on the site for less than 180 consecutive days or be fully licensed and highway ready.

H. The following uses by special permit as provided by § 180-71, if determined to be consistent with the purpose of this zone, said determination to be made by the Board of Appeals following application for a special permit by the landowner or owner:

(1) Developed recreation facilities, except buildings.

(2) Utility lines and facilities.

(3) Dams and other water control facilities, if in an authorized plan by a public agency or if built to create ponds for recreational or agricultural use.

(4) Minor buildings incidental to permitted flood control, recreation, agricultural, etc., uses, and not exceeding 200 square feet in ground coverage, if constructed so as to not obstruct natural hydrological features.

(5)

Deleted: In the floodway fringe, the Zone AE, Zone A, that portion of the Floodplain Zone outside the floodway, the development of structures for residential use only if the lowest floor (including the basement) is elevated to or above the level of the base flood (one-hundred-year flood) and the development of structures for nonresidential use only if the lowest floor (including the basement) is elevated to be above the level of the base flood (one-hundred-year flood) or, together with the attending utility and sanitary facilities, is floodproofed to or above the level of the base flood (one-hundred-year flood), provided that a special permit is issued by the Board of Appeals. The term "floodproofed" shall mean watertight, with walls substantially impermeable to the passage of water and with structural components having the capacity of resisting hydrostatic and hydrodynamic loads and effects of buoyancy....¶
.¶

Deleted: .¶

§ 180-70. Prohibited uses.

A. In those portions of the Town so specified in § 180-68 as "floodplain," the following uses of land shall be prohibited:

The bulk storage of buoyant, flammable, explosive or toxic materials.

The addition, removal or transfer of such quantities of material, including trees, shrubs, and ground cover, that would reduce the water storage capacity of the floodplain, obstruct the flow of floodwaters in a floodway or otherwise adversely affect the natural hydrology of the area to the extent that the base flood elevation has any increase.

The digging or drilling of a well intended as a source of domestic water.

The installation of septic tank or leaching fields or on-site waste disposal systems.

(1)

(2) The placement or location of a mobile home or the creation of mobile home parks or subdivisions.

(3)

(4)

(5)

Commented [ES8]: Per SFPM: MA WPA does not allow the base flood to be increased at all.

Re-phrase last part of sentence to read "…to the extent that the base flood elevation has any increase.

Deleted: would be raised cumulatively more than one foot

B. In land within the floodway the following uses of land shall be prohibited, in addition to those listed above:

(1) Any development within the portions of the Town so specified as "floodway" on the Flood Insurance Rate Map ~~or Flood Boundary & Floodway Map~~.

(2) Erection, construction or other creation or installation of any building, dam or other structure.

(3) In Zones A1-30 and AE, along watercourses that have a regulatory floodway designated on the Town's FIRM encroachments are prohibited in the regulatory floodway which would result in any increase in flood levels within the community during the occurrence of the base flood discharge.

Commented [DJ(9]: Agawam has only FIRMs.

Deleted: ;

Deleted: Any use or structure which would result in any increase in flood levels during the base flood discharge. Encroachments, including structures, are prohibited in the regulatory floodway which would result in any increase in flood levels within the community during the occurrence of the base flood discharge.¶

§ 180-xx. Permitting.

The Town of Agawam requires a permit for all proposed construction or other development in the floodplain overlay district, including new construction or changes to existing buildings, placement of manufactured homes, placement of agricultural facilities, fences, sheds, storage facilities or drilling, mining, paving and any other development that might increase flooding or adversely impact flood risks to other properties.

All local, state and federal permits that will be necessary in order to carry out the proposed development in the floodplain overlay district must be acquired by the proponent, who must submit a completed checklist demonstrating that all necessary permits have been acquired.

The Floodplain Management Approval must be the last approval in permitting process.

§ 180-71. Special permit.

A. The application for a special permit shall include a plan prepared and certified by a professional engineer or land surveyor registered in the Commonwealth of Massachusetts. This plan will show all proposed and existing buildings, structures, roads, ways, drainage facilities and landscape features, including wetlands, trees and the like, and other engineering and hydrological data the Board finds necessary. The plan will show all existing and proposed finished ground contours at one-foot intervals.

B. The application for a special permit shall also include an environmental impact statement prepared by an environmentally qualified registered professional engineer. This statement will describe the impact upon the physical environment of the proposed use.

C. The Board of Appeals may waive the requirements of Subsection B if it determines that the probable impact upon the physical environment of the proposed use is to be minimal and that an environmental impact statement is not necessary to its consideration of the application and provided there is no direct conflict with the Laws of the United States and the Commonwealth of Massachusetts.

D. The applicant shall provide the Board with an original and seven copies of the request and of any plan and/or environmental impact statement required under Subsections A and B above. The Board of Appeals shall within seven days forward one copy of each to the Inspector of Buildings, Planning Board, Board of Health and Conservation Commission. These agencies may file written recommendations with the Board of Appeals within 30 days of receipt of notification. The Board of Appeals shall not grant approval of an

application for a special permit until these recommendations have been received or until expiration of said thirty-day period.

E. In passing upon such request, the Board of Appeals shall consider all technical evaluations, all relevant factors, standards specified in other sections of this article and:

(1) The danger that materials may be swept onto other lands to the injury of others.

(2) The danger to life and property due to flooding or erosion damage.

(3) The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner.

(4) The importance of the services provided by the proposed facilities to the community.

(5) The necessity to the facility of a waterfront location, where applicable.

(6) The availability of alternative locations, not subject to flooding or erosion damage, for the proposed use.

(7) The compatibility of the proposed use with existing and anticipated development.

(8) The relationship of the proposed use to the Comprehensive Plan and Floodplain Management Program for that area.

(9) The safety of access to the property in times of flood for ordinary and emergency vehicles.

(10) The expected heights, velocity, duration, rate of rise and sediment transport of the floodwaters and the effects of wave action, if applicable, expected at the site.

(11) The costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical and water systems and streets and bridges.

F. The Board of Appeals may issue a permit under this section if it finds that the proposed use of the premises will not endanger the health and safety of the occupants of land within the floodplain or the public, or it may issue a permit with such conditions as it deems necessary to protect the health and safety of the occupants and the public or provide proper flood control or protection, or it may deny the application. The burden of showing that the proposed development will not endanger health and safety and that it will be an appropriate use of the land shall rest upon the developer, who shall provide such additional engineering and hydrological data as the Board of Appeals deems necessary. The Board shall, as a condition of approval, require that effective notice be given to prospective purchasers or existing landowners, by signs, notation on plans and permits or otherwise, of past flooding of said premises and the steps undertaken by the petitioner or his successor in title to alleviate the effects of the same.

G. Without limiting the generality of the foregoing, the Board shall ensure that:

(1) New construction or substantial improvements of residential structures within the Floodplain Zone will have the lowest floor (including the basement) elevated to or above the level of the one-hundred-year flood.

(2) No use or structure shall be located in the designated floodway which would result in any increase in flood levels during the base flood discharge.

(3) All other necessary permits for the proposed development, as defined in § 180-2, have been received from those federal, state or local governmental agencies from which price approval is required.

(4)

Deleted: No fill or encroachment within the designated floodway shall be permitted that would impair its ability to carry and discharge the waters resulting from the one-hundred- year flood, unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachments would not result in any increase in flood levels during the occurrence of the base flood discharge.¶

(5) New or replacement water supply systems and/or sanitary sewerage systems to be located in the Floodplain Zone shall be designed to minimize or eliminate infiltration of floodwaters into the systems and discharges from the systems into floodwaters.

All subdivision proposals must be designed to assure that:

(6)

(7)

(a) Such proposals minimize flood damage;

(b) All public utilities and facilities are located and constructed to minimize or eliminate flood damage; and

(c) Adequate drainage is provided to reduce exposure to flood hazards.

(8) In a riverine situation, the Building Inspector shall notify the following of any alteration or relocation of a watercourse:

(a) Adjacent communities and bordering states, especially upstream and downstream;

(b) NFIP State Coordinator, Massachusetts Department of Conservation and Recreation, at 251 Causeway Street, 8th floor, Boston, MA 02114-2104;

NFIP Program Specialist, Federal Emergency Management Agency, Region I, at 99 High Street, 6th Floor, Boston, MA 02110.

(c)

(9) The proponent must provide technical data to determine base flood elevations for each developable parcel shown on the design plans of subdivision proposals or other developments greater than 50 lots or five acres, whichever is the lesser, within unnumbered A Zones.

(10) In Zones A and AE, in the absence of FEMA BFE data and floodway data, the building department will obtain, review and reasonably utilize base flood elevation and floodway data available from a Federal, State, or other source as criteria for requiring new construction, substantial improvements, or other development in Zone A as the basis for elevating residential structures to or above base flood level, for floodproofing or elevating nonresidential structures to or above base flood level, and for prohibiting encroachments in floodways.

In Zones A, A1-30, and AE, along watercourses that have not had a regulatory floodway designated, the best available Federal, State, local, or other floodway data shall be used to prohibit encroachments in floodways which would result in any increase in flood levels within the community during the occurrence of the base flood discharge.

§ 180-72. General stipulations.

Deleted: Adjacent communities and the Massachusetts Department of Conservation and Recreation, at 251 Causeway Street, Suite 600-700, Boston, Massachusetts 02114, are notified prior to any alteration or relocation of a watercourse, and that evidence of such notification is submitted to FEMA, at 99 High Street, 6th Floor, Boston, MA 02110, and that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained.…

Deleted: Suite 600-700

Deleted: B

Deleted: data is required

Deleted: along watercourses that have not had a regulatory floodway designated, the best available federal, state, local, or other floodway data shall be used to prohibit encroachments in floodways which would result in any increase in flood levels within the community during the occurrence of the base flood discharge…

Commented [DJ[12]: Need to include this somewhere… for A zones without a regulatory floodway…

A. A subdivision filed with the Planning Board under Chapter 41 of the General Laws of Massachusetts shall meet the rules and regulations of the Planning Board as they apply to floodplain management.[11] The subdivision as approved by the Planning Board may be considered a single application when submitted to the Board of Appeals under this article. The action of the Planning Board shall in no way limit the Board of Appeals in its decision and setting of conditions.

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11. Editor's Note: See Art. VII, Floodplains, of Ch. 159, Subdivision of Land.

B. Nothing contained in this article shall limit the authority of the Board of Health with respect to premises in the Floodplain Zone or affect the applicability of the Building Code[12] to any building in the Floodplain Zone.

C. A building permit issued by the Inspector of Buildings before the effective date of this article shall be deemed to be a permit hereunder.

D. Any plans or applications submitted to any board, agent or authority of the Town which concerns land within the floodplain shall be noted: "This proposal is for land which lies in the floodplain and meets the requirements of the Floodplain Ordinance."

E. Any existing nonconforming uses or structures in the designated floodway shall not be substantially improved but may be modified, altered, repaired or reconstructed, subject to regulations pertaining to nonconforming uses, to incorporate floodproofing measures, provided that such measures or such modification, alteration, repair or reconstruction do not raise the level of the one-hundred-year flood at any point.

F. No new construction, alteration or extension of a structure for human occupancy as permitted under § 180-71 shall be allowed beyond the foundation stage until the elevation of the lowest floor (including the basement) has been checked and certified, in writing, to the Inspector of Buildings or as being the elevation as stated on the approved plans or higher. All final grades or any change in topography shall be checked and certified, in writing, as being according to the approved plans. Inspection and certification shall be made by a registered professional engineer or land surveyor. All costs incurred under this section shall be borne by the applicant. Records of these elevations and certifications shall be maintained in the office of the Inspector of Buildings and shall be open to public inspection.

G. Where interpretation is needed as to the exact location of the boundaries the Floodplain Zone (for example, where there appears to be conflict between a mapped boundary and actual field conditions), the Building Inspector shall consult the NFIP Program Specialist, FEMA and/or the NFIP State Coordinator at the Massachusetts Department of Conservation and Recreation for the necessary interpretation.

§ 180-73. Securities or bond required.

The completion of all earth work not bonded or covenanted under Chapter 41 of the General Laws of Massachusetts shall be guaranteed with the Town of Agawam by securities or bond as required by the Town prior to commencement by any earth work.

§ 180-74. Severability.

The invalidity of any section or provision of this article for regulation of the floodplain shall not invalidate any other section or provision hereof.

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12. Editor's Note: See Ch. 82, Building Construction.

THE TOWN OF AGAWAM

GREEN INFRASTRUCTURE & GREEN STREETS POLICY

Goal: The goal of this policy is to promote the use of, and protect existing, Green Street facilities and Green Infrastructure in public and private development as a cost-effective and sustainable practice for stormwater management in current and future projects wherever possible. This includes:

- Road reconstruction and new road development projects;
- New development and redevelopment projects.

Definitions:

Gray infrastructure: Human-engineered infrastructure such as treatment facilities, sewer systems, stormwater systems, pipelines, and storage basins. Gray infrastructure typically refers to components of a centralized approach to water management.

Green Infrastructure: Stormwater management facilities that make use of soils, plants, or natural processes to slow, absorb, and treat rainfall (and snowmelt) so that storm flows to nearby rivers, streams, and lakes are cleaner, less erosive in force, and smaller in volume. These facilities include rain gardens, tree box planters, and permeable pavement, but can also refer to pre-existing natural features, such as trees, wetlands, and forests.

Green Streets: Road rights-of-way that incorporate Green Infrastructure to complement or replace traditional gray infrastructure. Green Infrastructure elements of Green Streets can include permeable pavement, street trees, landscaped street-side planters or swales that filter, convey, and/or allow stormwater runoff to soak into the ground A Green Street can:

- Manage stormwater on site through use of vegetated facilities;
- Provide water quality benefits and replenishes groundwater (if an infiltration facility);
- Create attractive streetscapes by enhancing the pedestrian environment and introducing park-like elements into neighborhoods;
- Serve as an urban greenway segment, connecting neighborhoods, parks, recreation facilities, schools, main streets, and wildlife habitats; and
- Meet broader community goals by providing pedestrian and where appropriate bicycle access.

Drivers for Green Streets and Green Infrastructure:

The key factors driving the need for more Green Streets and Green Infrastructure include:

- The 2016 U.S. Environmental Protection Agency (EPA) Municipal Separate Storm Sewer System (MS4) stormwater permit, which expands stormwater management requirements to control the quality and amount of stormwater discharged from MS4s to rivers, streams, lakes, ponds, and wetlands.

- National Climate Adaptation Science Center climate projections that show annual precipitation in the Connecticut River basin is expected to increase by 1.3 to 6.2 inches by the 2050s and by up to 8.3 inches by the end of the century, and the frequency of high-intensity rainfall and storm events will continue to trend upwards. Costs and concerns associated with more frequent stormwater flooding events have driven communities toward Green Infrastructure as a cost-effective way to mitigate future flooding and manage runoff.

- The long-term costs of gray infrastructure maintenance, which have become burdensome as existing infrastructure ages. Communities are shifting toward hybrid systems of gray (piped) infrastructure combined with Green (vegetated) Infrastructure.

- Green Infrastructure can help the Town meet the federal Clean Water Act's surface water quality standards by filtering contaminants and cooling stormwater runoff before it enters receiving waters.

- Add some findings from stormwater master plan (2021)?

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Findings:

The Town of Agawam makes the following findings relative to stormwater runoff, Green Streets, and Green Infrastructure:

Stormwater runoff from streets, roads, parking lots, roofs and other impervious urban surfaces is a significant source of water pollution to our rivers, streams, and lakes, and also is a key contributor to localized flooding.

Green Streets and Green Infrastructure reduce and manage stormwater runoff through intercepting, evaporating, slowing, and absorbing flows.

Green Streets and Green Infrastructure improve water quality by filtering and/or absorbing stormflows, removing contaminants and cooling summer flows from parking lots and roadways before discharging to nearby surface waters, such as rivers, or lakes.

Green Streets and Green Infrastructure can provide cost-effective infrastructure solutions to stormwater management by reducing the scale or size needed for traditional gray infrastructure solutions, such as underground drains, tanks, pipes, and outfalls. Supplementing gray infrastructure with appropriately designed and managed green infrastructure can reduce overall project costs, enhance the quality of service that gray infrastructure provides, and act as an important redundancy measure to protect vulnerable waterways (Illinois Green Infrastructure Study, 2010).

Green Streets and Green Infrastructure can foster unique and attractive streetscapes that protect and enhance the quality of neighborhoods and integrate, rather than separate, the built and natural environments.

Green Streets and Green Infrastructure can serve to enhance the pedestrian environment and introduce park-like elements into neighborhoods.

When planned on a neighborhood scale, Green Streets can serve as urban greenways or pathways and provide a preferred means of connecting neighborhoods and parks/recreation areas in ways that are attractive to pedestrians and cyclists.

Green Streets and Green Infrastructure encourage landscaping and the planting of trees. In addition to stormwater management, these improved landscapes and trees produce environmental and public health benefits such as reduced summer air temperatures, improved air quality, carbon sequestration, and habitat corridors for wildlife such as pollinators and birds.

Green Streets and Complete Streets Compatibility:

Green Streets and Green Infrastructure elements included in the development, redevelopment and enhancement, and implementation of private and public development and roadway projects shall be applied in a manner sensitive to the context of the community's physical, economic, and social setting, and shall complement existing zoning and development standards and policies. In particular, Green Street techniques should be considered as a component of Complete Streets design, ensuring the street remains usable and safe for all people, regardless of mode. Green Infrastructure can be incorporated alongside roadways, bikeways, and/or sidewalks to improve drainage and increase cyclist and pedestrian comfort, enhance access during and after rainstorms, and provide shade and cooling effects to pathways. Additionally, Green Streets and Green Infrastructure facilities, such as vegetated curb bump-outs and roadway medians, can be used to calm and slow vehicular traffic and provide refuge for pedestrians when crossing roadways.

Resolutions:

Now, THEREFORE, IT IS HEREBY RESOLVED that the Town of Agawam hereby adopts a policy to promote the use of Green Street facilities and Green Infrastructure in public and private development.

IT IS FURTHER RESOLVED that the Town will work to implement its Green Streets and Infrastructure policy in the following ways:

Section 1. Role of the Town elected officials and staff:

a. Incorporate Green Street facilities and Green Infrastructure into all Town funded development, redevelopment or enhancement projects, to the maximum extent feasible.

b. Maintain these facilities according to Green Streets and Green Infrastructure best management practices:

1) Ensure that design of Green Street and Green Infrastructure facilities is conducive to ease of maintenance;
2) Ensure that all public and private projects include operation and maintenance agreements that provide easements for access to Green Infrastructure facilities and recognize Town enforcement authority; and
3) Dedicate staff to the regular inspection of municipally controlled facilities, and require identification of the party responsible for maintenance of privately controlled facilities.

c. Public Project Planning and Design:
   (1) Foster communication and coordination among Town Departments to encourage consideration of watershed health and improved water quality through use of Green Street facilities and Green Infrastructure as part of planning and design of Town projects.

   (2) Coordinate Town Department work programs and projects to implement Green Streets and Green Infrastructure as an integrated aspect of Town infrastructure.

   (3) Plan for large-scale use of Green Street facilities and Green Infrastructure as a means of better connecting neighborhoods, better use of the right of way, and enhancing neighborhood livability.

   (4) Strive to develop new and innovative means to cost-effectively construct new Green Street facilities and Green Infrastructure.

d. Private Development
   (1) Develop municipal standards for Green Streets and Green Infrastructure projects that can be permitted and implemented by the private sector into private development, redevelopment and enhancement projects.

   (2) Develop municipal standards to promote the use of preferred vegetated green infrastructure systems, such as stormwater tree pits, rain gardens, and green roofs to reduce stormwater runoff from roofs, parking lots, and other impervious surfaces in private development projects.

e. Project and Program Funding:
   (1) Seek opportunities to leverage the work and associated funding of projects in the same geographic areas across Departments to create Green Street and Green Infrastructure opportunities.

   (2) Develop a predictable and sustainable means of funding implementation and maintenance of Green Street and Green Infrastructure projects.

f. Outreach:

Commented [CM1]: These are listed as preferred in § 180-144 Performance standards for mixed-use developments, but nowhere else in zoning or subdivision are preferred systems identified. You could choose to:
1. Delineate preferred systems in SWM Ordinance/Regulations, in SPR, or Zoning, and here reference that location,
2. Identify preferred systems on town website or in stormwater application or SPR checklist, and reference that location here,
3. Here state that preferred systems are to be identified via conversation with stormwater authority, or
4. List systems here, if you assume they will not change in the future

(1) Educate citizens, businesses, and the development community/industry about Green Streets and Green Infrastructure and how they can serve as urban greenways to enhance, improve, and connect neighborhoods to encourage their support, demand and funding for these projects.

(2) Establish standard maintenance techniques and monitoring protocols for Green Street facilities and Green Infrastructure across Departments, and across groups within Departments.

g. Project Evaluation:

(1) Conduct ongoing monitoring of Green Street facilities and Green Infrastructure to evaluate facility effectiveness as well as performance in meeting multiple Town objectives for:

- Gallons managed;
- Projects distributed geographically by drainage area and by neighborhood; and
- Pedestrian and bicycle enhancements.

Section 2. Amendments

This policy may be amended at any time with the approval of all signatories.

Section 3. Effective Date/Authorization

This policy will become effective for when it is approved by vote of City Council and signed by the Mayor.

Approval by City Council:

_____ _____

President, City Council Date

Approval by Mayor:

_____ _____

Mayor Date

APPENDIX G: CAPITAL IMPROVEMENT PLAN

Town of Agawam, Massachusetts
2021 Stormwater Capital Improvement Plan

Funded by: Massachusetts Vulnerability Preparedness Grant Program



Prepared by:
Woodard & Curran, Inc.
40 Shattuck Road | Suite 110
Andover, Massachusetts 01810
800.426.4262

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Introduction

The Town of Agawam applied for, and received, a Municipal Vulnerability Preparedness (MVP) Action Grant from the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) to fund the development of a comprehensive Stormwater Master Plan (Master Plan). The MVP program supports a community-led planning process which aims to identify climate change vulnerabilities, prioritize critical actions, and build community resiliency. This Master Plan aims to address expressed community concern regarding chronic and intensifying flooding resulting from climate change is developed to address one of four top community priority actions identified in Agawam's MVP Summary of Findings, prepared in March 2020 following a Community Resilience Building (CRB) workshop.

This Master Plan also includes recommendations to inform the Town's capital planning activities to sustainability manage the Town's stormwater assets, reduce impervious cover, and promote green infrastructure to provide accessory environmental and public health benefits. These recommendations have been prioritized to develop capital improvement projects which combined result in this Stormwater Capital Improvement Plan (CIP). The CIP can be utilized by the Town to effectively manage and improve their stormwater infrastructure and plan for capital funding needs.

The CIP projects are intended to mitigate impacts resulting from climate change, maintain existing storm drain infrastructure, improve the condition of deteriorating infrastructure, and address known flooding issues throughout the Town. Of all the infrastructure assessed during the Stormwater Master Planning effort, 41 projects were identified and included in the CIP. In addition to the 41 projects identified through the assessments in the Plan, an additional 13 town-identified capital projects were added to the capital planning project recommendations to address known flooding issues. All projects identified in this CIP have been identified as the highest priority projects of the projects assessed in the Master Plan and projects identified by the Town.

CAPITAL IMPROVEMENT PROJECT STAGES

The infrastructure improvement or rehabilitation projects identified for the capital plan are generally broken down into one the following four (4) stages:

- Planning
- Conceptual
- Design
- Shovel Ready

Planning projects are considered projects where feasibility studies are conducted to determine if the project is worth pursuing from an engineering, permitting, and cost perspective. In the planning stage, preliminary alternatives can be chosen, permitting needs can be identified, and project practicality can be determined. Once it has been determined that a project is feasible, it moves into the conceptual phase where alternatives analysis and preliminary modeling efforts, if necessary, are conducted to help inform the design of a project. During this phase, survey, geotechnical studies, and resource area delineations are performed. Next, a project moves into the design phase that includes an engineering design of the selected alternative, as determined in the conceptual phase, and permitting. Lastly, the project moved into the shovel ready phase, where the design has been finalized, permits have been approved and acquired, and the project is ready to be constructed.

OPINION OF PROBABLE COST DEVELOPMENT

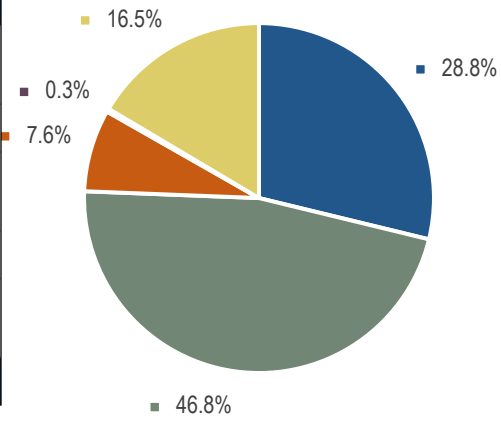
Woodard & Curran developed and opinion of probable cost (OPC) for each of the capital improvement projects identified for the CIP. Depending on the stage of development each project is in, the OPC includes survey, engineering, construction, and contingency estimates. Cost estimates for projects in the planning and conceptual stage were largely developed using the Massachusetts Department of Transportation (MassDOT) Construction Project Estimator, which provides a preliminary estimate based on current bid item data throughout the state of Massachusetts. These materials include pipes, catch basins, manholes, curbing, sidewalks, paving and other structures. For these projects, Woodard & Curran estimated probably quantities of materials and estimated duration of construction using limited data collected in the field and through desktop analyses.

More comprehensive OPCs have been developed for projects in the design and shovel ready phases since more information about these projects are known as compared to those projects in the planning or conceptual phase. For these types of projects, Woodard & Curran utilized in-house construction cost estimators that consider labor and material costs based on actual site conditions and market trends. These estimates are more detailed because actual site information, such as topography and geotechnical conditions, at the site and general project design are known.

OPINION OF PROBABLE COST

The capital improvement projects identified through the development of this Stormwater Master Plan and identified by the Town based on known flooding issues result in a comprehensive CIP that can be utilized by the Town to effectively manage and improve their stormwater infrastructure and plan for capital funding needs. The total cost to address all capital improvement projects included in the CIP is **$30,375,000** in 2021 dollars. This cost is subject to change as the capital improvement projects move into later stages of project development. A breakdown of the total OPC by project type is presented in the table and figure below. The OPC is summarized on a project-by-project basis in the next section.

Project Type	Estimated Cost (2021 $)	Percentage (%)
Culvert Replacement & Rehabilitation Projects	$8,740,000	28.8%
Detention Basin Projects	$2,310,000	7.6%
Storm Drain Rehabilitation & Upgrade Projects	$14,235,000	46.8%
Public Outreach Projects	$90,000	0.3%
Reoccurring Annual Allocation Projects	$5,000,000	16.5%
TOTAL COST	**$30,375,000**	**100%**

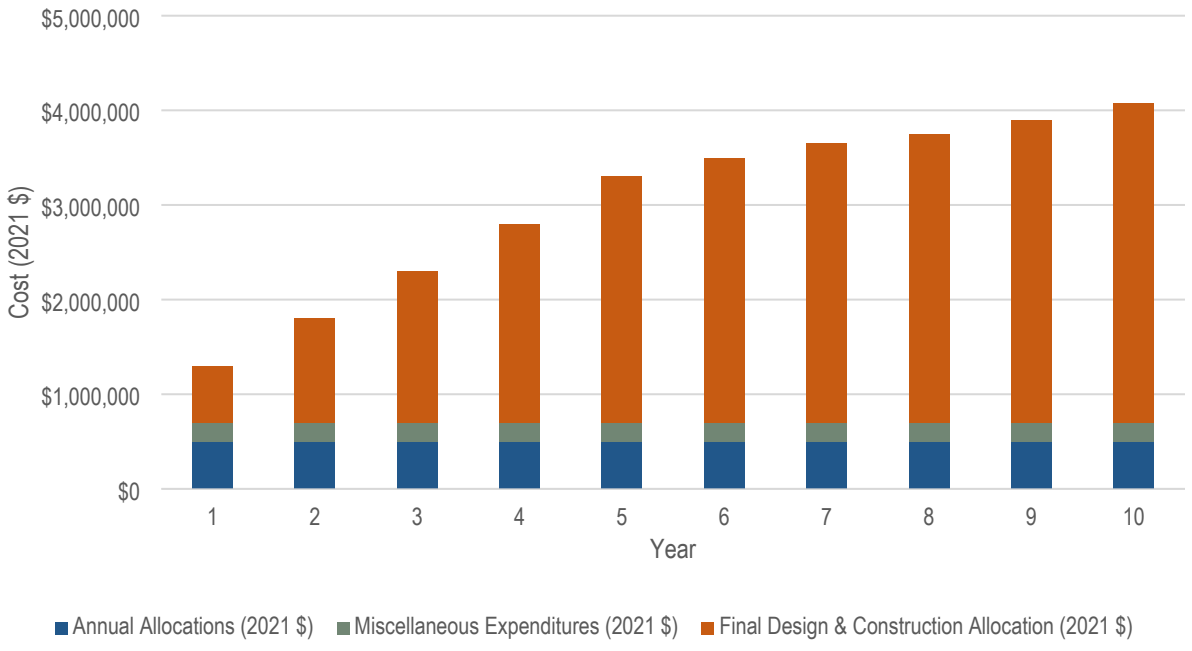


Capital Improvement Plan Spending Recommendations

To begin addressing the capital improvement projects identified in the CIP, the Town must determine how funds will be distributed over the 10-year planning period. It is recommended that $500,000 be allocated per year to reoccurring projects designed to allow the Town to advance assessments, designs, and construction of various infrastructure improvements. In addition to this annual allocation, Woodard & Curran recommends the Town allocate $200,000 per year for miscellaneous expenditures such as geotechnical evaluations, survey, wetlands delineation, grant and funding source pursuit, advancing infrastructure assessments, and updating the CIP. The remaining funds should be allocated to final design and construction costs associated with each project.

Preliminary annual estimated capital funding needs are presented in the table and figure below. Because the Town does not currently have many projects in the shovel ready stage, costs associated with construction may not be realized until later into the planning period.

Year	Annual Allocations (2021 $)	Miscellaneous Expenditures (2021 $)	Final Design & Construction Allocation (2021 $)	Annual Estimated Funds (2021 $)
1	$500,000	$200,000	$600,000	$1,300,000
2	$500,000	$200,000	$1,100,000	$1,800,000
3	$500,000	$200,000	$1,600,000	$2,300,000
4	$500,000	$200,000	$2,100,000	$2,800,000
5	$500,000	$200,000	$2,600,000	$3,300,000
6	$500,000	$200,000	$2,800,000	$3,500,000
7	$500,000	$200,000	$2,950,000	$3,650,000
8	$500,000	$200,000	$3,050,000	$3,750,000
9	$500,000	$200,000	$3,200,000	$3,900,000
10	$500,000	$200,000	$3,375,000	$4,075,000
Total	**$5,000,000**	**$2,000,000**	**$23,375,000**	**$30,375,000**



This CIP should be considered a living document and be reevaluated annually to help determine capital funding needs. Projects not current identified in the CIP may be added later depending on the Town's needs.

Total Estimated Opinion of Probable Cost Project Summary

Project Name	Replacement Total ($)
CLV-14: North Westfield Street (May Hollow) Culvert Replacement Project	$ 2,170,000.00
CLV-9: Southwick Street Culvert Replacement Project	$ 710,000.00
CLV-30: North Street Culvert Replacement Project	$ 400,000.00
CLV-90: Suffield Street Culvert Replacement or Lining Project	$ 450,000.00
CLV-85: Shoemaker Lane Culvert Replacement Project	$ 670,000.00
CLV-41: North Street (White Brook) Culvert Replacement Project	$ 1,780,000.00
CLV-8: Southwick Street Culvert Repair or Lining Project	$ 560,000.00
CLV-37: Springfield Street Culvert Replacement or Lining Project	$ 680,000.00
CLV-29: North Street Culvert Replacement Project	$ 940,000.00
CLV-148: Oak Street Culvert Replacement or Lining Project	$ 380,000.00
TOTAL CULVERT REPLACEMENT & REHABILITATION COST	**$ 8,740,000.00**
MGMT-56: Stormwater Basin Rehabilitation Project	$ 110,000.00
MGMT-31: Stormwater Basin Rehabilitation Project	$ 120,000.00
MGMT-15: Stormwater Basin Rehabilitation Project	$ 120,000.00
MGMT-28: Stormwater Basin Rehabilitation Project	$ 140,000.00
MGMT-14: Stormwater Basin Rehabilitation Project	$ 110,000.00
MGMT-5: Stormwater Basin Rehabilitation Project	$ 100,000.00
MGMT-49: Stormwater Basin Rehabilitation Project	$ 270,000.00
MGMT-12: Stormwater Basin Rehabilitation Project	$ 100,000.00
MGMT-27: Stormwater Basin Rehabilitation Project	$ 85,000.00
MGMT-29: Stormwater Basin Rehabilitation Project	$ 90,000.00
TOTAL DETENTION BASIN REHABILITATION COST	**$ 1,245,000.00**
MGMT-41: Stormwater Basin Retrofit Project	$ 150,000.00
MGMT-10: Stormwater Basin Retrofit Project	$ 130,000.00
MGMT-26: Stormwater Basin Retrofit Project	$ 140,000.00
MGMT-20: Stormwater Basin Retrofit Project	$ 110,000.00
MGMT-60: Stormwater Basin Retrofit Project	$ 150,000.00
MGMT-38: Stormwater Basin Retrofit Project	$ 85,000.00
MGMT-19: Stormwater Basin Retrofit Project	$ 110,000.00
MGMT-44: Stormwater Basin Retrofit Project	$ 90,000.00
MGMT-22: Stormwater Basin Retrofit Project	$ 100,000.00
TOTAL DETENTION BASIN RETROFIT COST	**$ 1,065,000.00**

Project Name	Replacement Total ($)
School Street: Drainage Rehabilitation Project	$ 580,000.00
Princeton Avenue: Drainage Rehabilitation Project	$ 585,000.00
Belvidere Avenue/Brookline Avenue: Drainage Study and Upgrades Project	$ 3,160,000.00
Memorial Park: Drainage Rehabilitation Project	$ 250,000.00
Meadow Street/Regency Park Drive: Drainage Study and Upgrades Project	$ 1,180,000.00
South Park Terrace: New Stormwater Conveyance System Project	$ 1,400,000.00
Fairview Street/Federal Street Extension: Drainage Study and Upgrades Project	$ 1,200,000.00
Ramah Circle: Drainage Study and Upgrades Project	$ 950,000.00
Liberty Street: Drainage Study Project	$ 1,000,000.00
Hall Street: Drainage Study Project	$ 875,000.00
Ellison Avenue: Drainage Study Project	$ 625,000.00
James Street/Maynard Street: Drainage Study Project	$ 1,200,000.00
#4 Hunters Greene Circle: Maintenance and Drainage Study Project	$ 30,000.00
#59 Rowley Street: Outfall Repair Project	$ 80,000.00
#43 Westford Circle: Outfall Repair Project	$ 80,000.00
Parkedge Drive Outfall Repair and Stabilization Project	$ 40,000.00
Walnut Street Extension Project	$ 1,000,000.00
TOTAL STORM DRAIN REHABILITATION & UPGRADE COST	**$ 14,235,000.00**
Impervious Area Mitigation Evaluation – Municipal Properties	$ 40,000.00
"How to Care for Your Stormwater Basin" Guidebook	$ 50,000.00
EVALUATION &PUBLIC OUTREACH PROJECTS COST	**$ 90,000.00**
Detention Basin Maintenance ($50k Annually)	$ 500,000.00
CCTV & Heavy Cleaning ($50k Annually)	$ 500,000.00
CCTV Investigation Repairs ($100k Annually)	$ 1,000,000.00
IDDE Catchment Investigations ($100k Annually)	$ 1,000,000.00
Outfall Repairs ($50k Annually)	$ 500,000.00
Town Wide H&H Model ($150k Annually)	$ 1,500,000.00
REOCCURRING ANNUAL ALLOCATION COSTS	**$ 5,000,000.00**
TOTAL CAPITAL IMPROVEMENT PLAN COST	**$ 30,375,000.00**

Capital Improvement Plan Projects

CULVERT REPLACEMENT & REHABILITATION PROJECTS

CLV 14: North Westfield Street (May Hollow) Culvert Replacement Project

Location: North Westfield Street, south of Parkedge Drive

Status: Conceptual

*Estimated Total Project Cost: $2,170,000

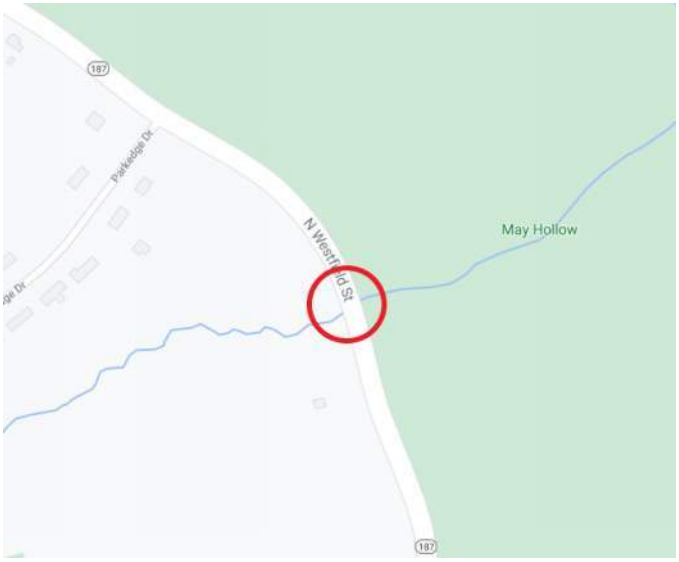
Risk Score	21.67
Likelihood of Failure	5 (Very High)
Consequence of Failure	4.33 (Very High)

This approximately 45-foot-long box culvert conveys flow east to west from May Hollow Brook, a tributary of the Westfield River under North Westfield Street into Robinson State Park. May Hollow Brook is classified as a Coldwater Fish Resource by the Massachusetts Division of Fisheries and Wildlife, meaning reproducing cold water fish are found in this Brook. North Westfield Street (Route 187) is classified as an Arterial roadway and is approximately 36 feet wide.

The culvert consists of an 8-foot-wide by 6-foot-tall box culvert, with approximately 6.5 feet of cover. The existing culvert is severely deteriorated and is reaching the end of its useful life. In late 2019, the Massachusetts Department of Transportation supported the Town's effort to design and construct temporary structural repairs of the culvert designed to last for a period of 3 years. Failure of this culvert would result in a significant safety hazard and the closure of North Westfield Street. Replacement of this culvert with a large box culvert or bridge, sized to convey at least the 50-year storm event, is recommended.



Existing Culvert



Crossing Location

*Construction estimates are subject to change based on findings within the conceptual stage.

CLV 9: Southwick Street Culvert Replacement Project

Location: Southwick Street, east of North West Street

Status: Planning

*Estimated Total Project Cost: $710,000

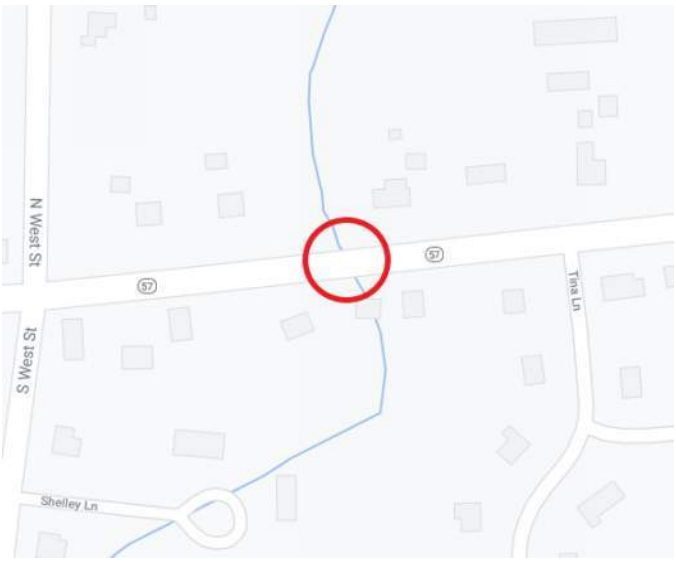
This approximately 60-foot-long box and arch culvert conveys flow north to south from an intermittent stream under Southwick Street, eventually discharges into Still Brook. Southwick Street (Route 57) is classified as a Major Arterial roadway and is approximately 30 feet wide.

The crossing consists of two culvert structures, one a 5.5 -foot wide, 3-foot tall, corrugated metal pipe and the other a 1.5-foot-tall by 2-foot-wide concrete box. There is approximately 6.5 feet of cover over the crown of the culverts. Significant cracking and deterioration of the culverts and headwalls and poor joint and seam conditions were observed by Woodard & Curran at these culverts during the Fall of 2020. Replacement of these structures with a singular concrete box culvert, sized to convey at least the 50-year storm event, is recommended.

Risk Score	18.67
Likelihood of Failure	4 (High)
Consequence of Failure	4.67 (Very High)



Existing Culvert



Crossing Location

*Construction estimates subject to change based on findings within the planning stage.

CLV 30: North Street Culvert Replacement Project

Location: North Street, 450 feet west of Wilbert Terrace

Status: Planning

*Estimated Total Project Cost: $400,000

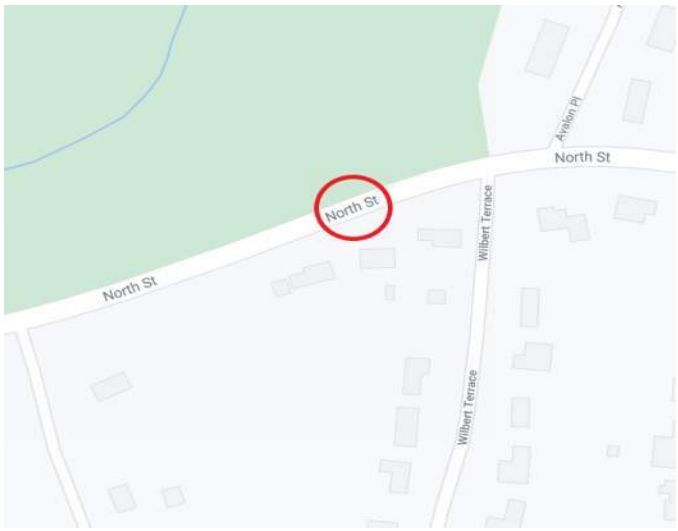
This approximately 95-foot-long culvert conveys flow from an intermittent stream under North Street, eventually discharging into Miller Brook. North Street is classified as an Arterial roadway and is approximately 30 feet.

The culvert consists of an 18-inch diameter culvert, with approximately 12 feet of cover over its crown. Significant conduit cracking and deterioration that was observed by Woodard & Curran during the Fall of 2020. In addition to structural defects, Woodard & Curran also observed downstream erosion and excess sediment and vegetation at the culvert. Replacement of this culvert with a reinforced concrete structure, sized to convey at least the 50-year storm event, is recommended.

Risk Score	*18.33*
Likelihood of Failure	*5 (Very High)*
Consequence of Failure	*3.67 (High)*



Existing Culvert



Crossing Location

*Construction estimates subject to change based on findings within the planning stage.

CLV 90: Suffield Street Culvert Replacement or Lining Project

Location: Suffield Street, South of Stanley Place

Status: Planning

*Estimated Total Project Cost: $530,000

Risk Score	18.33
Likelihood of Failure	5 (Very High)
Consequence of Failure	3.67 (High)

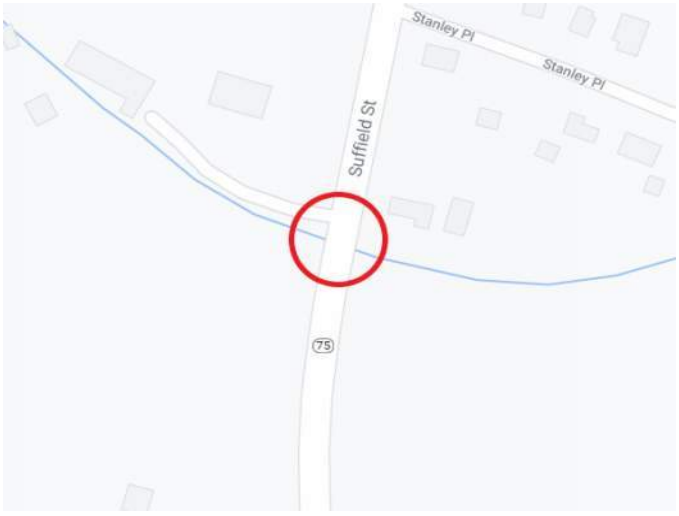
This approximately 75-foot-long culvert conveys flow west to east from an intermittent stream under Suffield Street, eventually discharging into the Westfield River. Suffield Street (Route 75) is classified as an Arterial roadway and is approximately 35 feet wide.

The culvert consists of a 30-inch diameter culvert, with approximately 8 feet of cover over its crown. Significant cracking and deterioration were observed by Woodard & Curran in both the conduit and headwall during the Fall of 2020. In addition to structural defects, Woodard & Curran also observed embankment erosion and excess vegetation in the culvert. Replacement of this culvert with a reinforced concrete structure, sized to convey at least the 50-year storm event, is recommended.

As an alternative to replacement, this culvert could be considered for relining with a geopolymer liner. This alternative would not repair the erosion observed on the embankment or increase the hydraulic capacity of the conduit but would significantly extend the life of the culvert.



Existing Culvert



Crossing Location

*Construction estimates subject to change based on findings within the planning stage.

CLV 85: Shoemaker Lane Culvert Replacement Project

Location: Shoemaker Lane, west of the entrance to the Crestview Country Club

Status: Planning

*Estimated Total Project Cost: $670,000

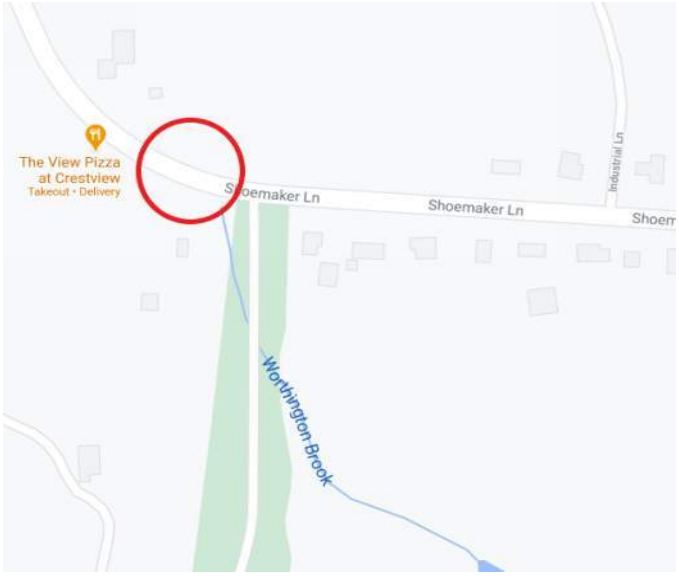
This approximately 60-foot-long culvert conveys Worthington Brook north to south under Shoemaker Lane, eventually discharging into Worthington Brook. Shoemaker Lane is classified as a Collector roadway and is approximately 35 feet wide.

The culvert diameter is unknown and has approximately 7 feet of cover over its crown. The pipe was too inundated with sediment for an accurate measurement of diameter during assessment by Woodard & Curran in the Fall of 2020. In addition, Woodard & Curran was unable to locate the outlet, indicating possible collapse. Replacement of this culvert with a reinforced concrete structure, sized to convey at least the 25-year storm event, is recommended.

Risk Score	17.50
Likelihood of Failure	5 (Very High)
Consequence of Failure	3.50 (High)



Existing Culvert



Crossing Location

*Construction estimates subject to change based on findings within the planning stage.

CLV 41: North Street (White Brook) Culvert Replacement Project

Location: North Street, east of Sylvan Lane

Status: Design

*Estimated Total Project Cost: $1,780,000

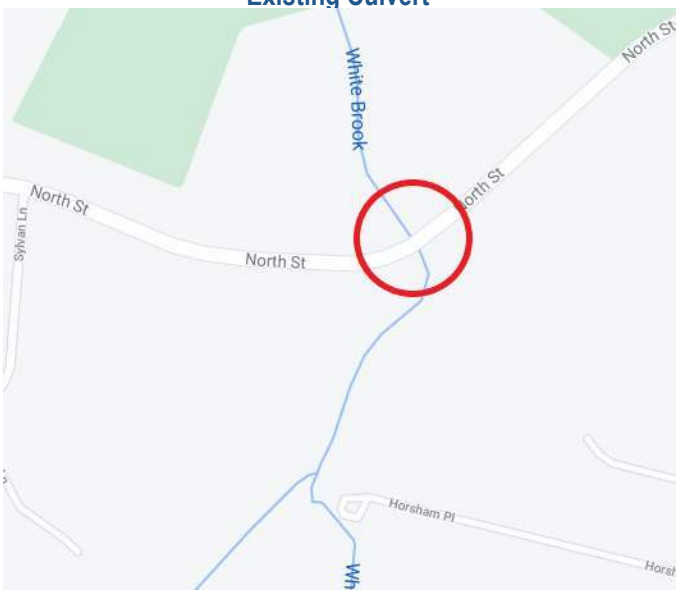
Risk Score	17.33
Likelihood of Failure	4 (High)
Consequence of Failure	4.33 (Very High)

This approximately 127-foot-long culvert conveys flow south to north from White Brook under North Street, eventually discharging into the Westfield River. White Brook is classified as a Coldwater Fish Resource by the Massachusetts Division of Fisheries and Wildlife, meaning reproducing cold water fish are found in this Brook. North Street is classified as an Arterial roadway and is approximately 36 feet wide.

The culvert consists of a 36-inch culvert that transitions into a 42-inch culvert, with approximately 12 feet of cover over its crown. Significant conduit cracking and deterioration was observed by Woodard & Curran during the Fall of 2020. In addition to structural defects, embankment, and streambank erosion both up and downstream is present at the site. A hydrologic and hydraulic assessment was conducted in 2020 evaluate various 3-sided precast concrete spans as the replacement culvert. Replacement of this culvert and reinforcement of the up and downstream embankment is recommended.



Existing Culvert



Crossing Location

*Construction estimates subject to change based on findings within the design stage.

CLV 8: Southwick Street Culvert Repair or Lining Project

Location: Southwick Street, west of Carmel Lane

Status: Planning

*Estimated Total Project Cost: $630,000

This approximately 50-foot-long box culvert conveys flow north to south from an intermittent stream under Southwick Street, eventually discharging into Still Brook. Southwick Street (Route 57) is classified as a Major Arterial roadway and is approximately 30 feet wide.

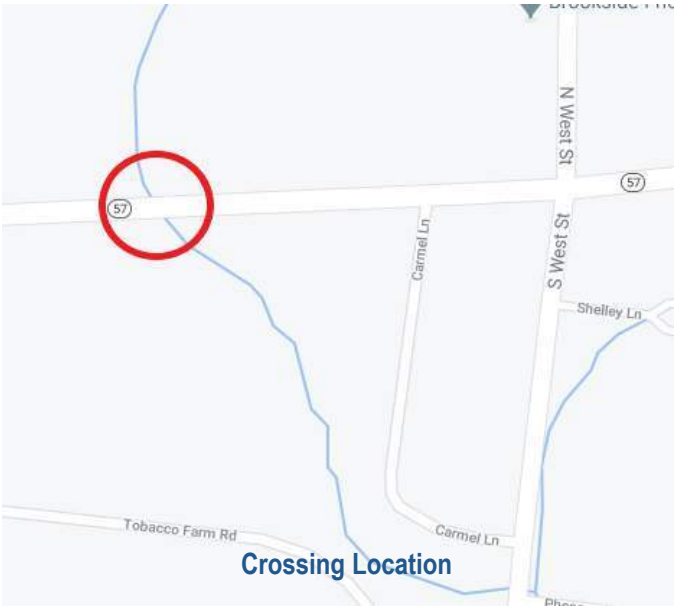
The crossing consists of a 3-foot-tall by 5-foot-wide concrete box. There is approximately 4 feet of cover over the crown of the culvert. Significant cracking and deterioration of the culvert and headwall were observed by Woodard & Curran during the Fall of 2020. Replacement of this structure with a reinforced concrete box culvert, sized to convey at least the 50-year storm event, is recommended.

As an alternative to replacement, this culvert could be considered for relining with a geopolymer liner. This alternative would not repair the erosion observed on the embankment or increase the hydraulic capacity of the conduit but would significantly extend the life of the culvert.

Risk Score	16.00
Likelihood of Failure	4 (High)
Consequence of Failure	4.00 (High)



Existing Culvert



Crossing Location

*Construction estimates subject to change based on findings within the planning stage.

CLV 37: Springfield Street Culvert Replacement or Lining Project

Location: Springfield Street, west of Northwood Street

Status: Planning

*Estimated Total Project Cost: $760,000

Risk Score	*16.00*
Likelihood of Failure	*4 (High)*
Consequence of Failure	*4.00 (High)*

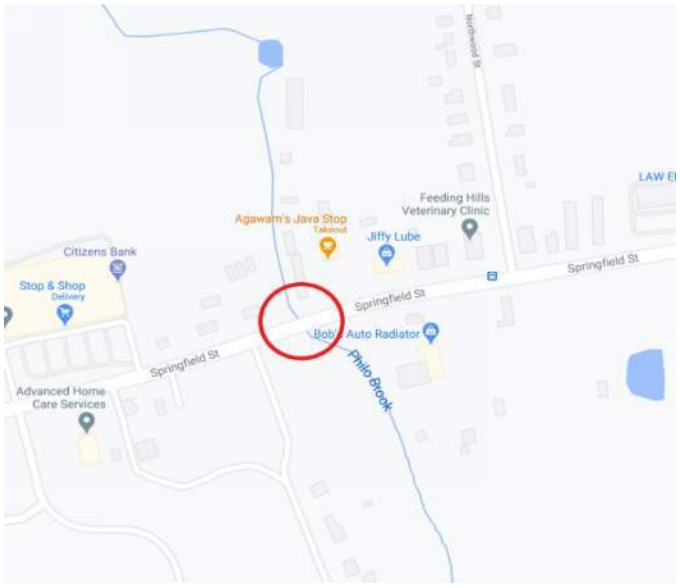
This approximately 60-foot-long box culvert conveys flow north to south from Philo Brook under Springfield Street, eventually discharging into Muddy Brook. Springfield Street is classified as a Major Arterial roadway and is approximately 35 feet wide.

The crossing consists of a 3-foot-tall by 8-foot-wide concrete box. There is approximately 3.5 feet of cover over the crown of the culvert. Significant deterioration of the culvert and erosion upstream of the headwall was observed by Woodard & Curran at the culvert during the Fall of 2020. Replacement of the structure with a reinforced concrete box culvert, sized to convey at least the 50-year storm event, is recommended.

As an alternative to replacement, this culvert could be considered for relining with a geopolymer liner. This alternative would not repair the erosion observed on the embankment or increase the hydraulic capacity of the conduit but would significantly extend the life of the culvert.



Existing Culvert



Crossing Location

*Construction estimates subject to change based on findings within the planning stage.

CLV 29: North Street Culvert Replacement Project

Location: North Street, east of Elizabeth Street

Status: Planning

*Estimated Total Project Cost: $940,000

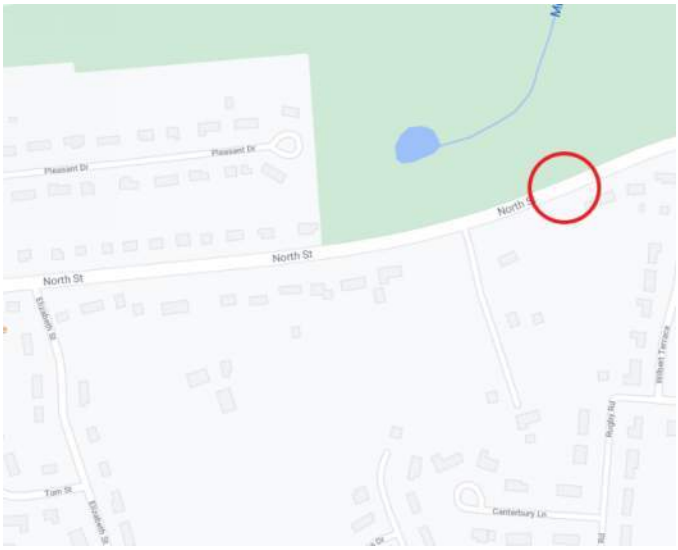
This approximately 185-foot-long pipe culvert conveys flow south to north from an intermittent stream under North Street, eventually discharging into the Miller Brook. North Street is classified as an Arterial roadway and is approximately 35 feet wide.

The culvert consists of a 24-inch diameter culvert, with approximately 15 feet of cover over its crown. During the Fall of 2020, Woodard & Curran observed large amounts of vegetation within the conduit, the downstream headwall has collapsed, and bank erosion. In addition, Woodard & Curran also observed two downstream pipe sections had broken off from the conduit. Replacement of this culvert with a reinforced concrete structure, sized to convey at least the 50-year storm event, is recommended.

Risk Score	*14.67*
Likelihood of Failure	*4 (High)*
Consequence of Failure	*3.67 (High)*



Existing Culvert



Crossing Location

*Construction estimates subject to change based on findings within the planning stage.

CLV 148: Oak Street Culvert Replacement or Lining Project

Location: Oak Street, west of Springfield Street

Status: Planning

*Estimated Project Cost: $430,000

Risk Score	14.67
Likelihood of Failure	4 (High)
Consequence of Failure	3.67 (High)

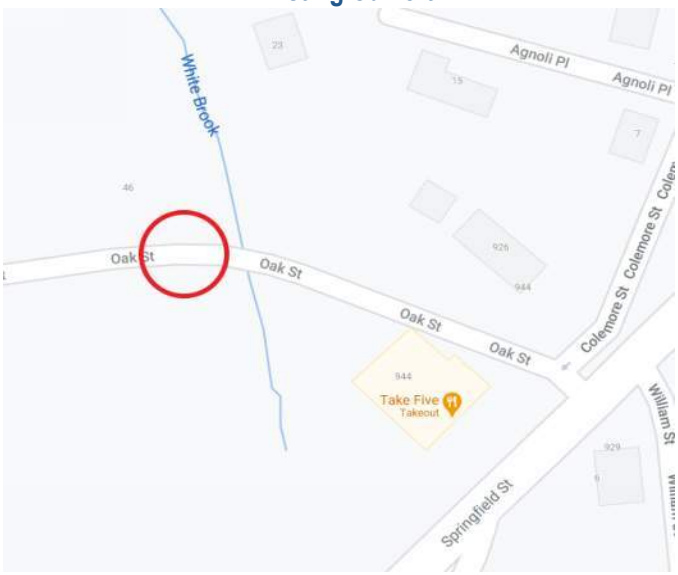
This approximately 45-foot-long pipe culvert conveys flow south to north from White Brook under Oak Street, eventually discharging into the Westfield River. White Brook is classified as a Coldwater Fish Resource by the Massachusetts Division of Fisheries and Wildlife, meaning reproducing cold water fish are found in this Brook. Oak Street is classified as a dead-end roadway and is approximately 20 feet wide.

The culvert consists of a 30-inch diameter culvert, with approximately 10 feet of cover over its crown. Large amounts bank erosion both up and downstream and cracking within the conduit was observed by Woodard & Curran during the Fall of 2020. In addition, Woodard & Curran observed the outlet projecting very high from the stream, resulting in erosion to the streambed. Replacement of this culvert with a reinforced concrete structure, sized to convey at least the 25-year storm event, is recommended.

As an alternative to replacement, this culvert could be considered for relining with a geopolymer liner. This alternative would not repair the erosion observed on the embankment or increase the hydraulic capacity of the conduit but would significantly extend the life of the culvert.



Existing Culvert



Crossing Location

*Construction estimates subject to change based on findings within the planning stage.

DETENTION BASIN REHABILITATION PROJECTS

MGMT-56: Stormwater Basin Rehabilitation Project

Location: Burlington Drive

Status: Planning

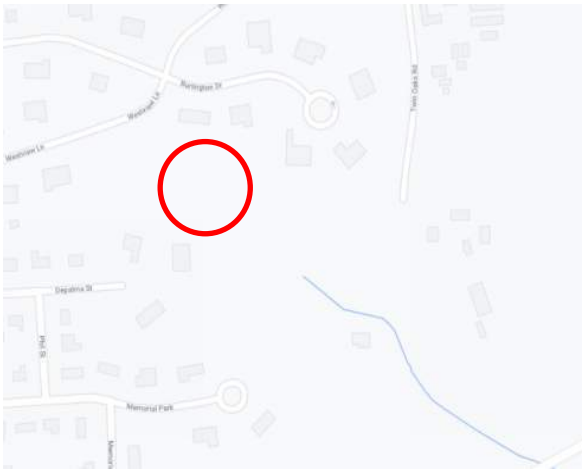
*Estimated Project Cost: $110,000

This approximately 16,000 square-foot stormwater basin treats stormwater runoff conveyed from Burlington Drive and portions of Westview Lane. This basin discharges to a small intermittent stream, which ultimately discharges to the Town's Silver Lake Reservoir.

The basin consists of one 24-inch inlet pipe and one outlet control structure with a 12-inch outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed that several cubic yards of sand had been imported into the basin to create a dirt bike track. This addition of sand to the basin does not only reduce the basin's ability to infiltrate and filter stormwater, but also degrades water quality and puts downstream habitats at risk. In addition to the sand, several rodent holes were observed in the basin's impoundment area, embankments and the locations of the basin's inlet pipe and outlet control structure were completely overgrown, and there was evidence of yard waste dumping within the basin. Removal of the imported sand, filling rodent holes, clearing and grubbing the areas surrounding the inlet and outlet pipes, retrofitting the basin by installing a sediment forebay, installing a "no dumping sign," and educating nearby landowners on the negative effects of sediment in stormwater are recommended for this basin.



MGMT-56



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-31: Stormwater Basin Rehabilitation Project

Location: Wagon Wheel Drive

Status: Planning

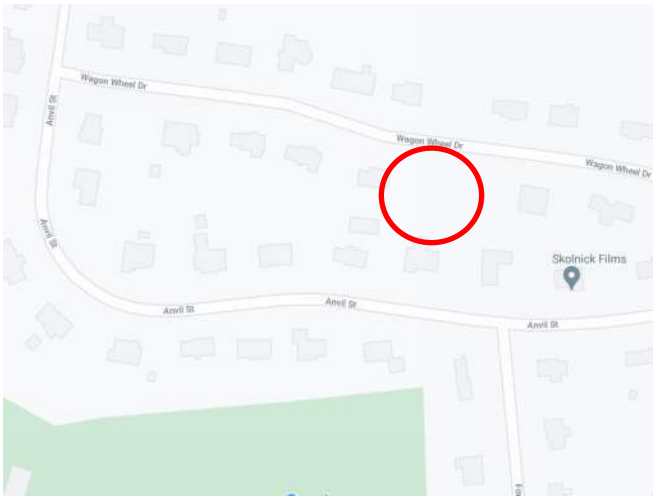
*Estimated Total Project Cost: $115,000

The approximately 5,300 square-foot stormwater basin treats stormwater runoff conveyed from portions of Wagon Wheel Drive and Anvil Street. This basin discharges to the Philo Brook watershed.

The basin appears to be an offline stormwater storage and treatment best management practice (BMP) and consists of one mapped 12-inch inlet pipe and inlet structure, with no outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed unmapped 30-inch, 6-inch, and 4-inch inlet pipes in the southwest corner of the basin, which appear to be causing erosion to the surrounding embankment and the basin's impoundment area. The basin's southern embankment appeared to be eroding as well, and there was evidence of dumping within the basin. During the assessment, Woodard & Curran observed a surge of water flowing into the basin from above the crown of the unmapped 30-inch inlet pipe, believed to be a possible illicit discharge. Installing a concrete headwall surrounding the three unmapped basin inlet pipes in the southwest corner of the basin, installing jute matting on the basin's southern embankment, conducting building inspections and dye testing in the vicinity of the basin to determine if there is an illicit discharge entering the basin, and installing a "no dumping sign" are recommended for this basin.



MGMT-31



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-15: Stormwater Basin Rehabilitation Project

Location: Marla Place

Status: Planning

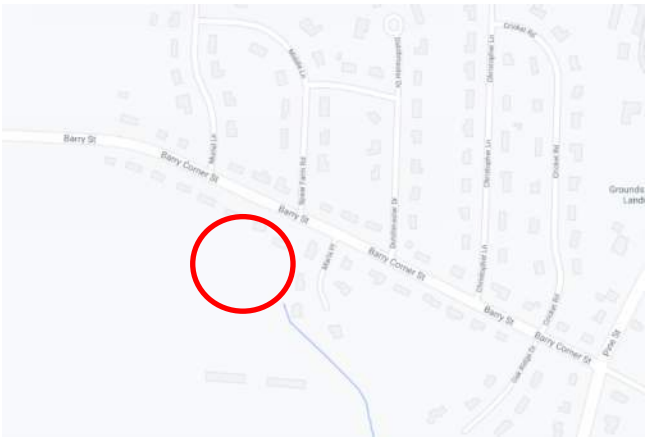
*Estimated Total Project Cost: $110,000

This approximately 6,500 square-foot basin treats stormwater conveyed from Marla Place and a small portion of Barry Street. This basin discharges to an unnamed tributary, which ultimately discharges to Spears Pond in the Town of Suffield, Connecticut.

The basin consists of one 15-inch inlet pipe and one outlet control structure with a 21-inch outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed that the basin was completely overgrown, the flared end section of outlet pipe was disconnected, the emergency spillway, the embankment surrounding the outlet pipe, and portions of the impoundment area were eroding, and there was evidence of dumping within the basin. Clearing and grubbing the basin, repairing the outlet pipe's flared end section, installing jute matting in areas where erosion was observed, retrofitting the basin by installing a sediment forebay, and installing a "no dumping sign" are recommended for this basin.



MGMT-15



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-28: Stormwater Basin Rehabilitation Project

Location: Princeton Avenue

Status: Planning

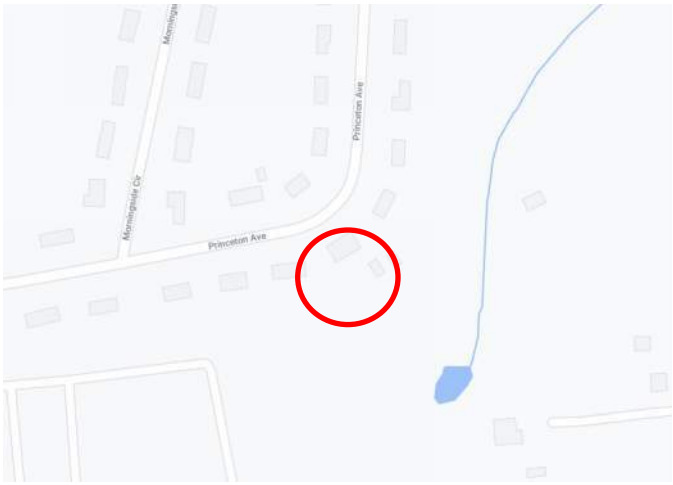
*Estimated Total Project Cost: $125,000

This approximately 31,300 square-foot stormwater basin treats stormwater runoff conveyed from Princeton Avenue and portions of Morningside Circle. This basin discharges to an unnamed stream that ultimately discharges to the White Brook watershed.

The basin consists of one 24-inch inlet pipe and one 21-inch outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed that the basin was completely overgrown, the basin's outlet pipe was buried, there was significant erosion downstream of the inlet pipe's headwall, there was erosion caused by the small stream running through basin, and there was erosion caused by driveway runoff traveling via overland flow to basin. Clearing and grubbing portions of the basin, removing sediment from around and above the basin's outlet pipe, installing jute matting in areas where erosion was observed, and retrofitting the basin by installing a sediment forebay are recommended for this basin.



MGMT-28



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-14: Stormwater Basin Rehabilitation Project

Location: Middle Lane

Status: Planning

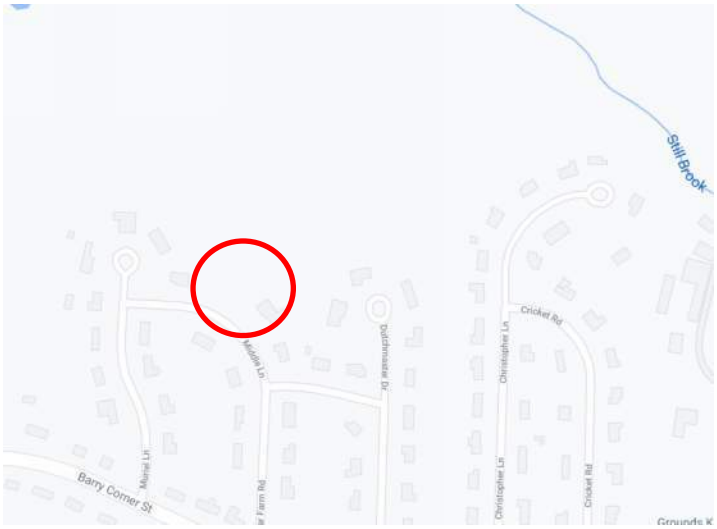
*Estimated Total Project Cost: $105,000

This approximately 19,400 square-foot stormwater basin treats stormwater runoff conveyed from Middle Lane, Muriel Lane, Spear Farm Road, and Dutchmaster Drive. This basin discharges to the Still Brook watershed.

The basin consists of one 30-inch inlet pipe and one outlet control structure with an 18-inch outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed that there was a tree growing through the basin's inlet pipe, rodent holes in the side slopes, the embankment surrounding the outlet pipe was eroding, and there was evidence of dumping within the basin. Removing the tree growing through the basin's inlet pipe, repair of the inlet pipe, installing jute matting over the embankment surrounding the outlet pipe, and retrofitting the basin by installing a sediment forebay, and installing a "no dumping sign" are recommended for this basin.



MGMT-14



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-5: Stormwater Basin Rehabilitation Project

Location: Logan Place

Status: Planning

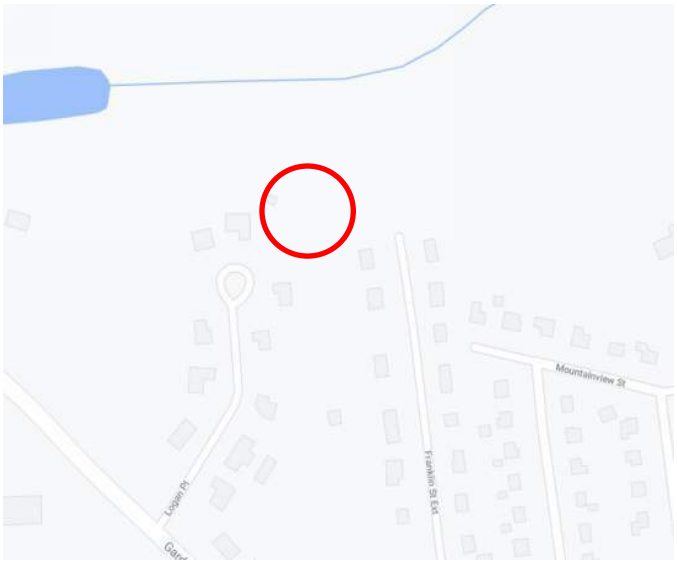
*Estimated Total Project Cost: $95,000

This approximately 5,800 square-foot stormwater basin treats stormwater runoff conveyed from Logan Place. This basin discharges to the Silver Lake Reservoir watershed.

The basin consists of one 15-inch inlet pipe and one outlet control structure with an 8-inch outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed that the basin was completely overgrown, the side slopes were eroding and were partially collapsed in some locations, approximately half of perimeter chain link fence was damaged, and there was evidence of dumping within the basin. Clearing and grubbing the basin, repairing the basin's side slopes and installing jute matting on the slopes, repairing the chain link fence, retrofitting the basin by installing a sediment forebay, and installing a "no dumping sign" are recommended for this basin.



MGMT-5



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-49: Stormwater Basin Rehabilitation Project

Location: Shoemaker Lane

Status: Planning

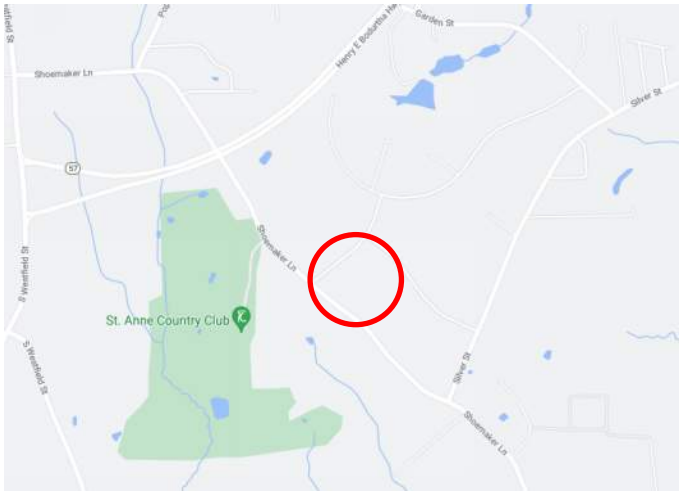
*Estimated Total Project Cost: $250,000

This approximately 142,000 square-foot stormwater basin treats stormwater runoff conveyed from Shoemaker Lane, Silver Street, and Herbert P. Almgren Drive. This basin discharges to the Philo Brook watershed.

The basin consists of three inlet pipes and a 21-inch outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed a tree growing through one of the inlets pipes in the northeast portion of the basin and that an area with bare soil to the east of the basin was causing sediment to run off into the basin. Removing the tree growing through the basin's inlet pipe, seeding the area of bare soil to the east of the basin, and retrofitting the basin by installing a sediment forebay are recommended for this basin.



MGMT-49



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-12: Stormwater Basin Rehabilitation Project

Location: Richardson Place

Status: Planning

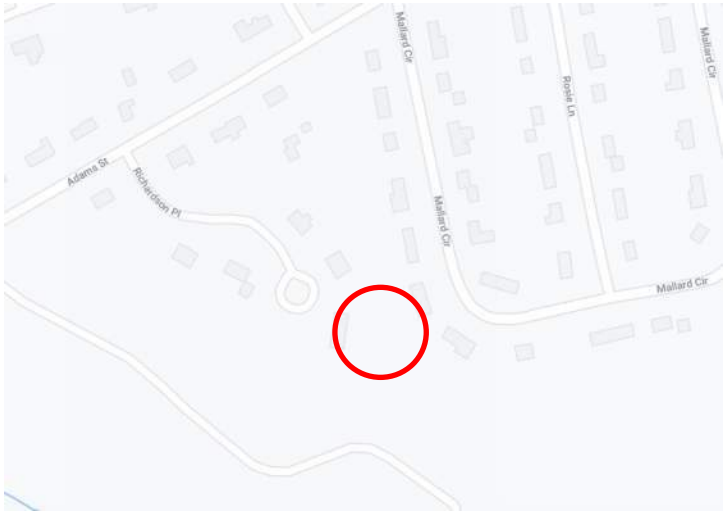
*Estimated Total Project Cost: $95,000

This approximately 5,500 square-foot stormwater basin treats stormwater runoff conveyed from Richardson Place, Mallard Circle, and Rosie Lane. This basin discharges to the Tarkill Brook watershed.

The basin consists of one 15-inch inlet pipe and one outlet control structure with a 12-inch outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed that the basin was completely overgrown, there was a tree growing through the outlet control structure, and there was evidence of dumping within the basin. Clearing and grubbing the basin, removing, and replacing the damaged outlet control structure, retrofitting the basin by installing a sediment forebay, and installing a “no dumping sign” are recommended for this basin.



MGMT-12



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-27: Stormwater Basin Rehabilitation Project

Location: Avalon Place

Status: Planning

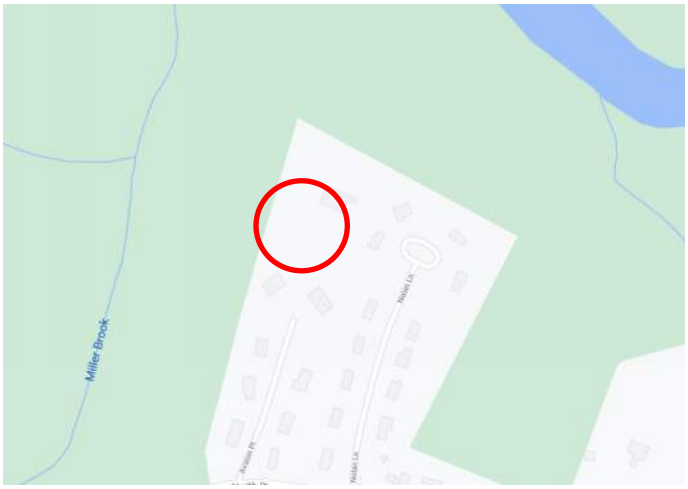
*Estimated Total Project Cost: $85,000

This approximately 6,100 square-foot stormwater basin treats stormwater runoff conveyed from Avalon Place. This basin discharges to the Miller Brook watershed and is near Robinson State Park.

The basin consists of an 18-inch inlet pipe and one outlet control structure with an 8-inch outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed that the basin was completely overgrown, there was a tree growing through the inlet pipe, and there was evidence of dumping within the basin. Clearing and grubbing the basin, removing the tree growing through the basin's inlet pipe, retrofitting the basin by installing a sediment forebay, and installing a "no dumping sign" are recommended for this basin.



MGMT-27



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-29: Stormwater Basin Rehabilitation Project

Location: Wagon Wheel Drive

Status: Planning

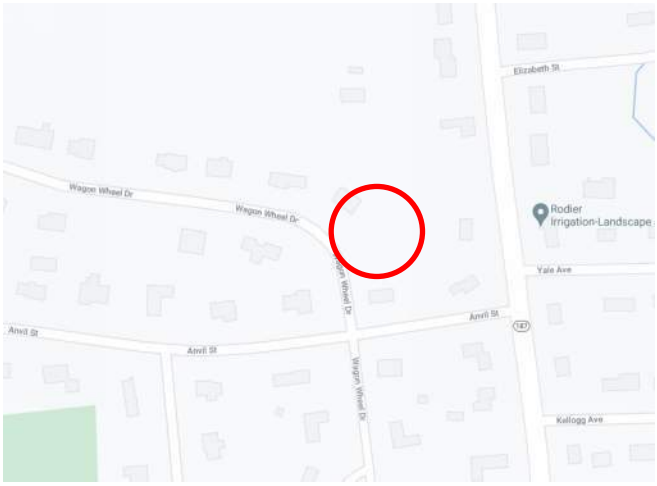
*Estimated Total Project Cost: $90,000

This approximately 3,900 square-foot stormwater basin treats stormwater runoff conveyed from Wagon Wheel Drive and Anvil Street. This basin discharges to the Philo Brook watershed.

The basin appears to be an offline stormwater storage and treatment best management practice (BMP) and consists of one mapped 18-inch inlet pipe and one outlet control structure with a 12-inch outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed that the basin was completely overgrown, that the outlet control structure was destroyed, and there was evidence of dumping within the basin. Clearing and grubbing the basin, installing a new outlet control structure, retrofitting the basin by installing a sediment forebay, and installing a "no dumping sign" are recommended for this basin.



MGMT-29



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

DETENTION BASIN RETROFIT PROJECTS

MGMT-41: Stormwater Basin Retrofit Project

Location: Greenwood Street

Status: Planning

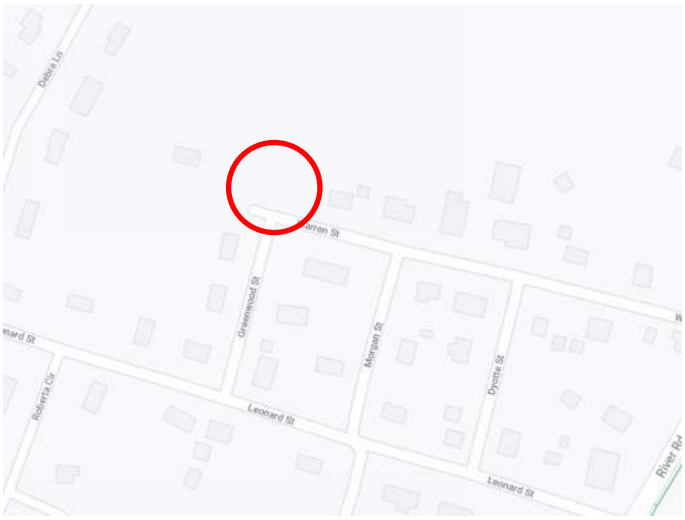
*Estimated Total Project Cost: $145,000

This approximately 1,800 square-foot stormwater basin treats stormwater runoff conveyed from Greenwood Street, Morgan Street, Leonard Street, Debra Lane, Peros Drive, Roberta Circle, Dyotte Street, Warren Street. This basin discharges to the Connecticut River watershed and is also located within the river's flood plain (1% annual chance of flooding, with base flood elevation [BFE]).

The basin appears to behave more as a swale than a stormwater basin, and consists of an inlet structure, one mapped 12-inch inlet pipe, and one unmapped 4-inch inlet pipe, with no outlet control structure or outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed that the area surrounding the inlet pipe was eroded and the flared end section was damaged, there were bare spots on the basin's side slopes and impoundment area, and there was evidence of dumping within the basin. Repairing the inlet pipe's flared end section, reseeding bare spots within the basin, and retrofitting the basin by installing a sediment forebay, increasing the basin's storage capacity by deepening the basin, raising embankment elevations, and/or installing an outlet control structure, installing plantings to filter out pollutants, and installing a "no dumping sign" are recommended for this basin.



MGMT-41



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-10: Stormwater Basin Retrofit Project

Location: Oakmont Place

Status: Planning

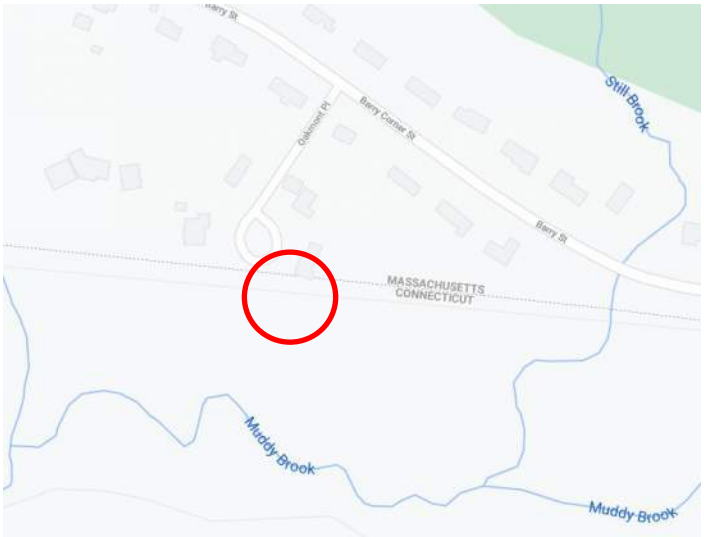
*Estimated Total Project Cost: $125,000

This approximately 1,800 square-foot stormwater basin treats stormwater runoff conveyed from Oakmont Place. This basin discharges to Still Brook and Muddy Brook watersheds and is also located near a flood plain (1% annual chance of flooding, with base flood elevation [BFE]).

The basin appears to behave more as a swale than a stormwater basin and consists of one 12-inch inlet pipe and one 12-inch outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed that there was erosion and scouring at the basin's inlet, the inlet grate was clogged with leaves, and there was sediment at the base of the impoundment area. Removing the basin's inlet grate and retrofitting the basin by installing a sediment forebay, increasing the basin's storage capacity by deepening the basin, raising embankment elevations, and/or installing an outlet control structure, installing and plantings to filter out pollutants are recommended for this basin.



MGMT-10



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-26: Stormwater Basin Retrofit Project

Location: Roosevelt Avenue

Status: Planning

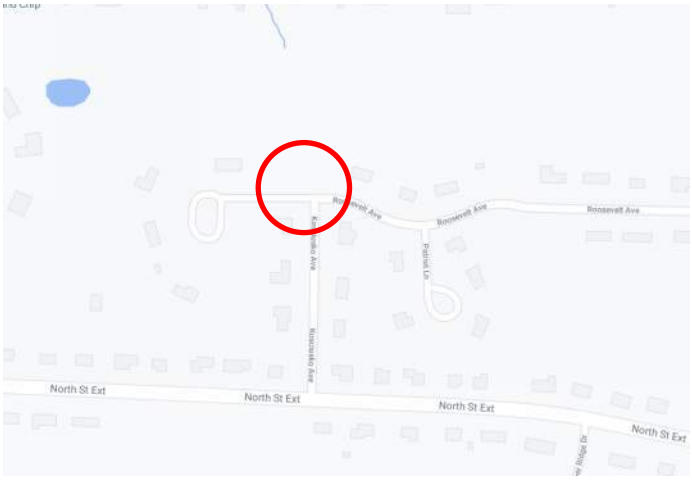
*Estimated Total Project Cost: $135,000

This approximately 7,000 square-foot stormwater basin treats stormwater runoff conveyed from Roosevelt Avenue and Kosciusko Avenue. This basin discharges to the May Hollow watershed and is also located near wetlands.

The basin consists of one 24-inch inlet pipe and one 15-inch outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed that the basin was completely overgrown, there was dead woody vegetation surrounding and falling towards the basin, the basin's outlet pipe was out of alignment, and there was evidence of dumping within the basin. Clearing and grubbing the basin, removing dead trees surrounding the basin, repairing the basin's outlet pipe, and retrofitting the basin by installing a sediment forebay, increasing the basin's storage capacity installing an outlet control structure, installing plantings to filter out pollutants, and installing a "no dumping sign" are recommended for this basin.



MGMT-26



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-20: Stormwater Basin Retrofit Project

Location: Nolan Lane

Status: Planning

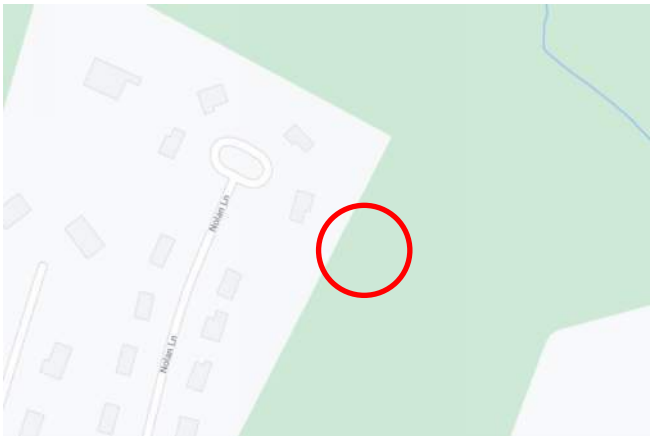
*Estimated Total Project Cost: $110,000

This approximately 9,500 square-foot stormwater basin treats stormwater runoff conveyed from Nolan Lane. This basin discharges to the White Brook watershed and is also located near Robinson State Park.

This basin consists of one 18-inch and one 8-inch inlet pipe, with no outlet control structure or outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed erosion and sediment build up at the discharge points of both inlet pipes. Removing sediment from the area surrounding the inlet pipes and retrofitting the basin by installing a sediment forebay and installing plantings to filter out pollutants are recommended for this basin.



MGMT-20



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-60: Stormwater Basin Retrofit Project

Location: Robin Ridge Drive

Status: Planning

*Estimated Total Project Cost: $145,000

This approximately 14,000 square-foot stormwater basin treats stormwater runoff conveyed from Robin Ridge Drive. This basin discharges to the Westfield River watershed and is also located near Robinson State Park.

The basin consists of a 12-inch inlet pipe and one outlet control structure with an 18-inch outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed that the basin was completely overgrown and that there was sediment build up at the discharge point of the basin's inlet pipe. Clearing and grubbing the basin, removing sediment from the area surrounding the inlet pipe, and retrofitting the basin by installing a sediment forebay, increasing the basin's storage capacity modifying the basin's outlet control structure, and installing plantings to filter out pollutants are recommended for this basin.



MGMT-60



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-38: Stormwater Basin Retrofit Project

Location: Walter Way

Status: Planning

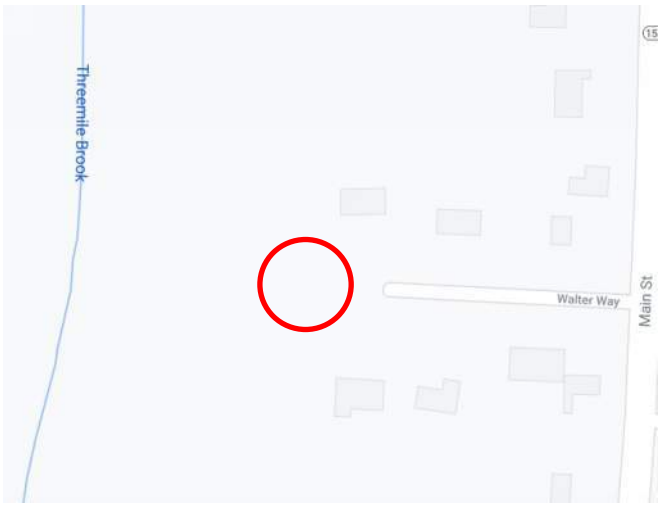
*Estimated Total Project Cost: $85,000

This approximately 2,800 square-foot stormwater basin treats stormwater runoff conveyed from Walter Way. This basin discharges to the Threemile Brook watershed and is also located within a flood plain (1% annual chance of flooding, with base flood elevation [BFE]).

The basin consists of one 12-inch inlet pipe and one 12-inch outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed that the basin was completely overgrown and that there was sediment build up at the discharge point of the basin's inlet pipe. Clearing and grubbing the basin, removing sediment from the area surrounding the inlet pipe, and retrofitting the basin by installing a sediment forebay are recommended for this basin.



MGMT-38



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-19: Stormwater Basin Retrofit Project

Location: Katy Lane

Status: Planning

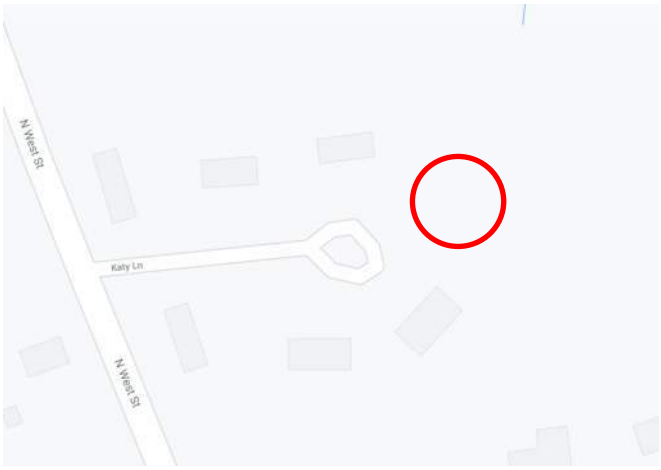
*Estimated Total Project Cost: $105,000

This approximately 2,100 square-foot stormwater basin treats stormwater runoff conveyed from Katy Lane. This basin discharges to the May Hollow watershed.

The basin consists of one inlet structure and 12-inch inlet pipe and one 8-inch outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed that the basin's inlet pipe discharges approximately 6 inches above the surrounding ground surface, causing erosion within the basin's impoundment area. Repairing the eroded portions of the basin's impoundment and retrofitting the basin by installing a sediment forebay, increasing the basin's storage capacity installing an outlet control structure, and installing additional plantings to filter out pollutants are recommended for this basin.



MGMT-19



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-44: Stormwater Basin Retrofit Project

Location: Barney Street

Status: Planning

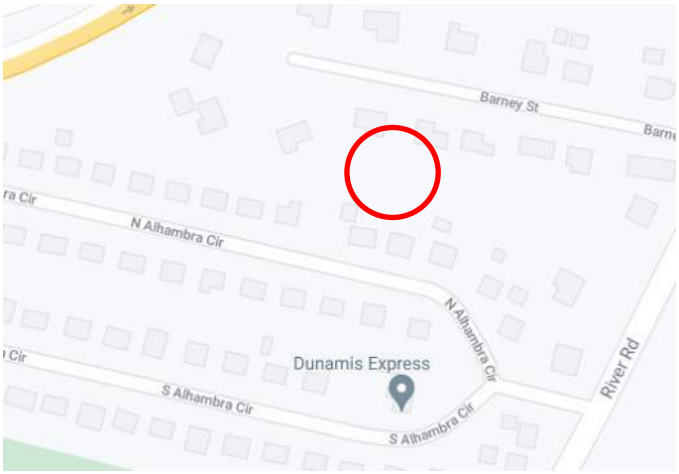
*Estimated Total Project Cost: $90,000

This approximately 4,500 square-foot stormwater basin treats stormwater runoff conveyed from Barney Street and Alhambra Circle. This basin discharges to the Connecticut River watershed.

The basin consists of one 12-inch and one 8-inch inlet pipe and what appears to be a leaching catch basin structure in the middle of the basin. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed sediment and leaf build up at the discharge points of both inlet pipes. Removing sediment and leaves from the area surrounding the inlet pipes and retrofitting the basin by installing a sediment forebay and installing plantings to filter out pollutants are recommended for this basin.



MGMT-44



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

MGMT-22: Stormwater Basin Retrofit Project

Location: Alice Lane

Status: Planning

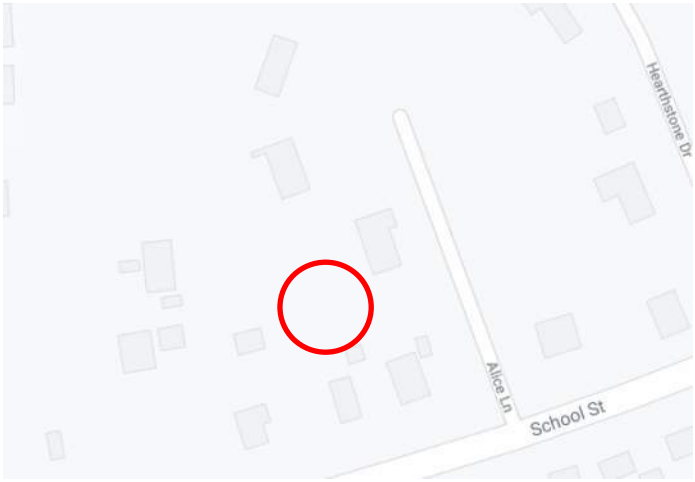
*Estimated Total Project Cost: $95,000

This approximately 8,200 square-foot stormwater basin treats stormwater runoff conveyed from Alice Lane. This basin discharges to the Connecticut River watershed.

The basin consists of one 15-inch inlet pipe and one outlet control structure with a 15-inch outlet pipe. During the assessment of the basin during the Fall of 2020, Woodard & Curran observed that the basin's inlet pipe was clogged and the surrounding area was overgrown, the trash rack on the outlet control structure was clogged with leaves, and that the inlet pipe and the outlet control structure were located only about 20 feet apart. Removing leaves and other debris from the area surrounding the inlet pipe and the outlet control structure's trash rack and retrofitting the basin by installing a sediment forebay, relocating the basin's outlet control structure to increase the flow path of stormwater within the basin, and installing plantings to filter out pollutants are recommended for this basin.



MGMT-22



Basin Location

*Construction estimates subject to change based on findings within the planning stage.

STORM DRAIN REHABILITATION & UPGRADE PROJECTS

School Street: Drainage Rehabilitation Project

Location: School Street

Status: Planning

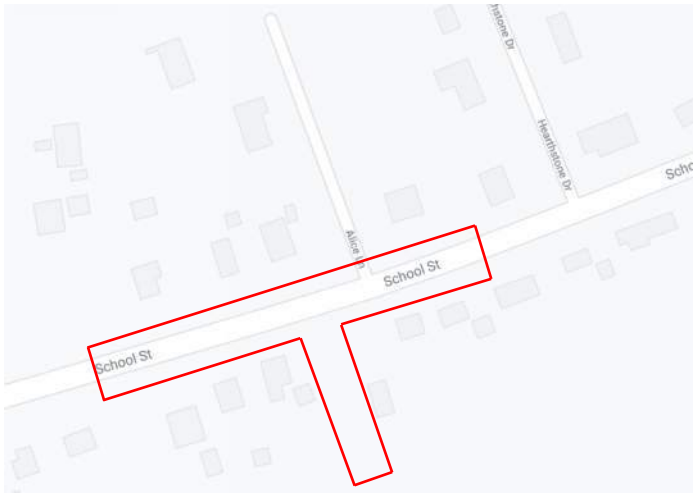
*Estimated Total Project Cost: $525,000

This approximately 450 linear feet of storm drainpipe conveys stormwater from School Street to outfall UN-56-955. This drainage network discharges to the Connecticut River watershed.

The portion of the stormwater conveyance system proposed for improvements consists of 15-inch storm drainpipe segments and 3 drainage structures between manhole DMH-1299 and catch basin CB-3203, and 15-inch storm drainpipe segments between CB-3199 and outfall UN-56-955. During closed-circuit television (CCTV) investigations of the UN-56-955 catchment during the Winter of 2021, Woodard & Curran's subcontractor, BMC Corp., observed several moderate to severe structural pipe defects throughout the investigated portions of the catchment, including a sink hole in the outfall pipe segment between an unmapped catch basin immediately south of CB-3199 in the driveway of 184 School Street and the outfall. In addition, erosion was observed at the outfall pipe's discharge point. Repairing the damaged storm drainpipes using trenched and trenchless rehabilitation methods, repairing the sink hole and replacing the 15-inch outfall pipe segment, protecting the embankment beneath the outfall, and considering of end-of-pipe stormwater treatment are recommended for this location.



Pipe Segment DGM-6461



Storm Drain Rehabilitation Location

*Construction estimates subject to change based on findings within the planning stage.

Princeton Avenue: Drainage Rehabilitation Project

Location: Princeton Avenue

Status: Planning

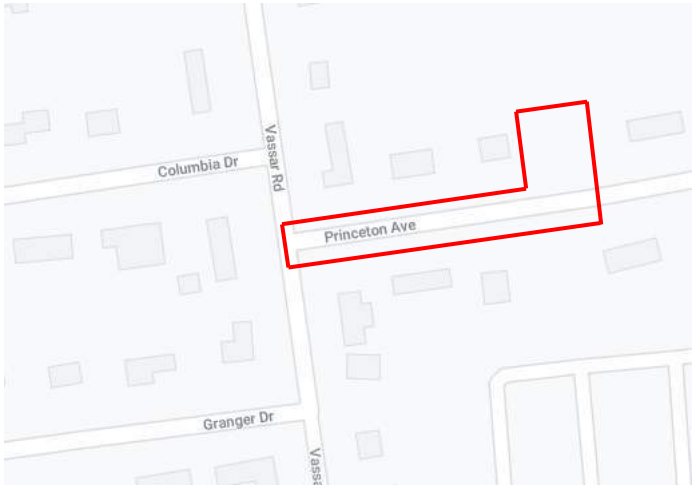
*Estimated Total Project Cost: $535,000

This approximately 500 linear feet of storm drainpipe conveys stormwater from Princeton Avenue, Vassar Road, Granger Drive, Columbia Drive, Cambridge Street, Kellogg Avenue, and Fordham Avenue to outfall WH-17-849. This drainage network discharges to the White Brook watershed.

The portion of the stormwater conveyance system proposed for improvements consists of storm drain manholes DMH-616 and DMH-471, 4 catch basins, two 36-inch storm drainpipes, and outfall WH-17-849. During closed-circuit television (CCTV) investigations of the WH-17-849 catchment during the Winter of 2021, Woodard & Curran's subcontractor, BMC Corp., observed several slope inconsistencies in the 36-inch outlet pipe connecting DMH-471 to outfall WH-17-849, causing severe scouring on the embankment off Princeton Avenue and the potential for pipe failure. In addition, segments of the 36-inch outlet pipe were disconnected and causing erosion beneath the pipe. Replacing the 36-inch outfall pipe segment, the upstream 36-inch pipe segment, storm drain manhole DMH-471, and the outfall structure on Princeton Avenue to address slope inconsistencies and the potential for erosion and scouring, protecting the steep embankment from Princeton Avenue to outfall WH-17-849, and considering of end-of-pipe stormwater treatment are recommended for this location.



WH-17-849



Storm Drain Rehabilitation Location

*Construction estimates subject to change based on findings within the planning stage.

Belvidere Avenue/Brookline Avenue: Drainage Study and Upgrades Project

Location: Belvidere Avenue/Brookline Avenue

Status: Planning

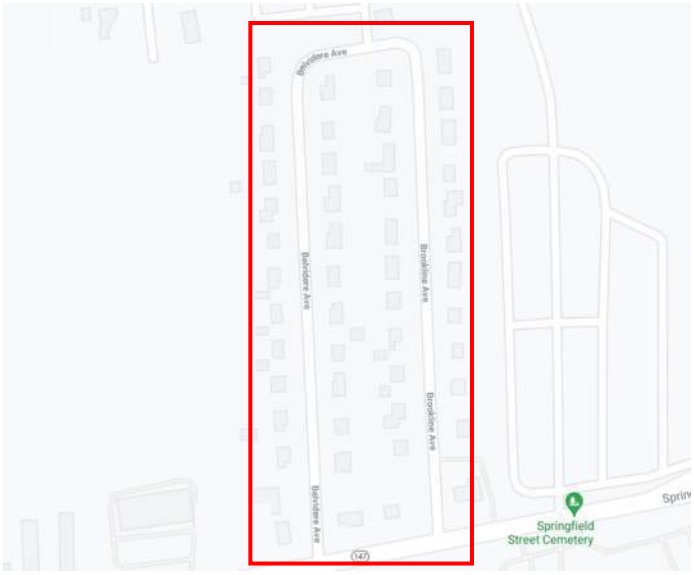
*Estimated Total Project Cost: $2,875,000

This approximately 2,000 linear feet of storm drainpipe conveys stormwater from Belvidere Avenue and Brookline Avenue to outfall WH-19-302. This drainage network ultimately to the White Brook watershed.

This stormwater conveyance system consists of several storm drain manholes, catch basins, and segments of 12-inch storm drainpipe, all discharging to outfall WH-19-302. During closed-circuit television (CCTV) investigations of the WH-19-302 catchment during the Winter of 2021, Woodard & Curran's subcontractor, BMC Corp., observed that several of the storm drainpipes in the conveyance system needed to be cleaned and that the storm drain manhole immediately upstream of outfall WH-19-302, DMH-90, and the 12-inch outfall pipe segment were severely damaged and were causing the surrounding areas to erode. In addition, the stormwater conveyance system on Belvidere Avenue and Brookline Avenue is undersized, which has been causing flooding in the area for several years. Conducting a drainage study to understand the stormwater runoff patterns on Belvidere Avenue and Brookline Avenue, determine an adequate storm drainpipe size to convey flows from these two streets to the outfall, and consider of end-of-pipe stormwater treatment, replacing the entire stormwater conveyance system, and repairing outfall WH-19-302 are recommended for this location.



WH-19-302



Storm Drain Study and Upgrade Location

*Construction estimates subject to change based on findings within the planning stage.

Memorial Park: Drainage Rehabilitation Project

Location: Memorial Park

Status: Planning

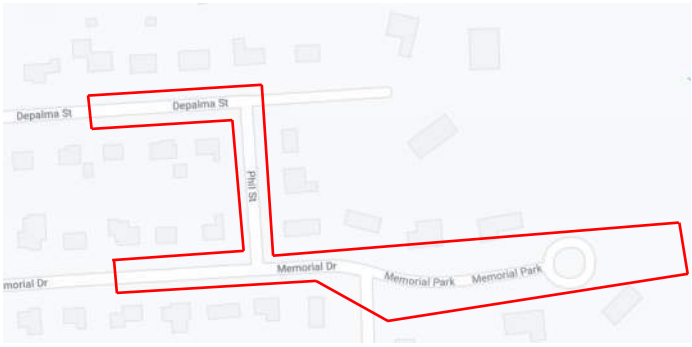
*Estimated Total Project Cost: $310,000

This approximately 1,650 linear feet of storm drainpipe conveys stormwater from Memorial Park, Memorial Drive, Phil Street, and Depalma Street to outfall TM-20-293. This drainage network discharges to the Threemile Brook watershed.

This stormwater conveyance system consists of several storm drain manholes, catch basins, and segments of 10- to 18-inch storm drainpipe, all discharging to outfall TM-20-293. During closed-circuit television (CCTV) investigations of the TM-20-293 catchment during the Winter of 2021, Woodard & Curran's subcontractor, BMC Corp., observed moderate to severe pipe defects throughout the catchment. In addition, segments of the 18-inch outlet pipe were damaged, causing erosion beneath the pipe and at the pipe's discharge point. Repairing the damaged storm drainpipes using trenched and trenchless rehabilitation methods, replacing the 18-inch outfall pipe segment, protecting the embankment beneath the outfall, and considering of end-of-pipe stormwater treatment are recommended for this location.



TM-20-293



Storm Drain Rehabilitation Location

*Construction estimates subject to change based on findings within the planning stage.

Meadow Street/Regency Park Drive: Drainage Study and Upgrades Project

Location: Meadow Street/Regency Park Drive

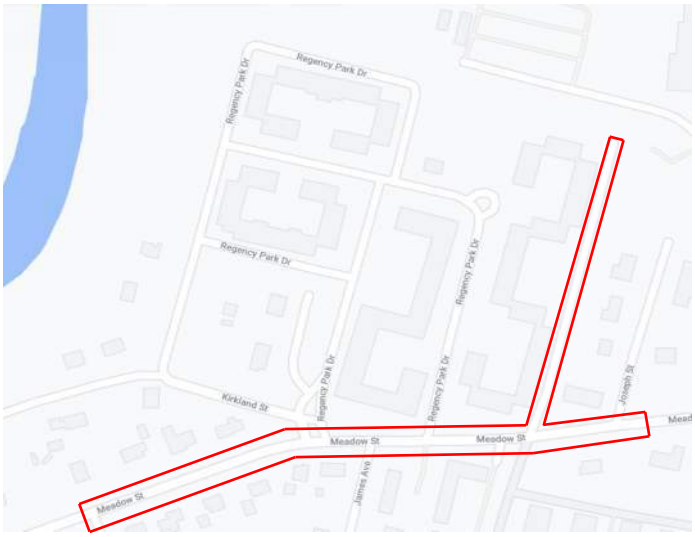
Status: Conceptual

*Estimated Total Project Cost: $1,180,000

In recent years, Agawam residents have been reporting severe flooding during storm events on Meadow Street, near the Regency Condominiums on Regency Park Drive and Joseph Street. During certain storm events, the flooding has made Meadow Street and Regency Park Drive impassible.

In 2017, the DPW conducted a closed-circuit television (CCTV) inspection of the drainage system in this area, and it was discovered that the cross-country storm drainpipe running parallel to the Regency Condominium property line was heavily impacted with debris and tree roots. The DPW flushed the pipe, which seemed to temporarily help the flooding situation. In 2019, Tighe & Bond conducted a CCTV investigation of the Meadow Street drainage network closer to James Avenue and Kirkland Street and found that many of the storm drainpipes had fractures or breaks.

In June 2021, the Town of Agawam began the design of drainage improvements seeking to address historic flooding along Meadow Street and surrounding the Regency Condominiums located at Regency Park Drive. The Town is hoping to construct these drainage improvements during the 2022 construction season.



Storm Drain Study and Upgrade Location

*Construction estimates subject to change based on findings within the design stage.

South Park Terrace: New Stormwater Conveyance System Project

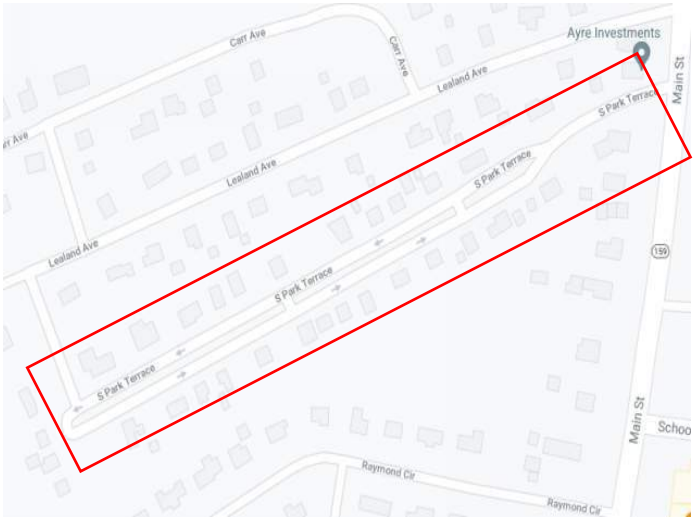
Location: South Park Terrace

Status: Planning

*Estimated Total Project Cost: $1,400,000

Residents living on South Park Terrace have reported street and yard flooding during large storm events in recent years. The drainage network on South Park Terrace mostly consists of several dry wells and the soils in the surrounding area are not ideal for infiltrating stormwater, which is likely increasing the volumes of stormwater flooding the street and residents' properties.

Prior to this Stormwater Master Plan, Tighe & Bond conducted a topographic survey and drainage study of the South Park Terrace and surrounding area. Based on the results of this investigation, Tighe & Bond recommended that the Town install a stormwater conveyance system on South Park Terrace that discharges to the existing drainage network on Raymond Circle. During the design phase of the project, calculations will need to be completed to determine whether the Raymond Circle drainage network will need to be upsized to accommodate additional stormwater volumes from South Park Terrace.



New Stormwater Conveyance System Location

*Construction estimates subject to change based on findings within the design stage.

Fairview Street/Federal Street Extension: Drainage Study and Upgrades Project

Location: Fairview Street/Federal Street Extension

Status: Planning

*Estimated Total Project Cost: $1,200,000

In recent years, Agawam residents have been reporting flooding during large storm events on Fairview Street, the Federal Street Extension, and residential driveways off both streets. Previous CCTV investigations of the drainage system in this area have shown that the pipes are impacted by tree roots and may be too damaged to repair via heavy cleaning efforts.

Recommended next steps for this project include additional CCTV of the drainage network on Fairview Street and the Federal Street Extension, a drainage study, and stormwater infrastructure replacement and upgrades, seeking to address historic flooding on both roadways.



Storm Drain Study and Upgrade Location

*Construction estimates subject to change based on findings within the design stage.

Ramah Circle: Drainage Study and Upgrades Project

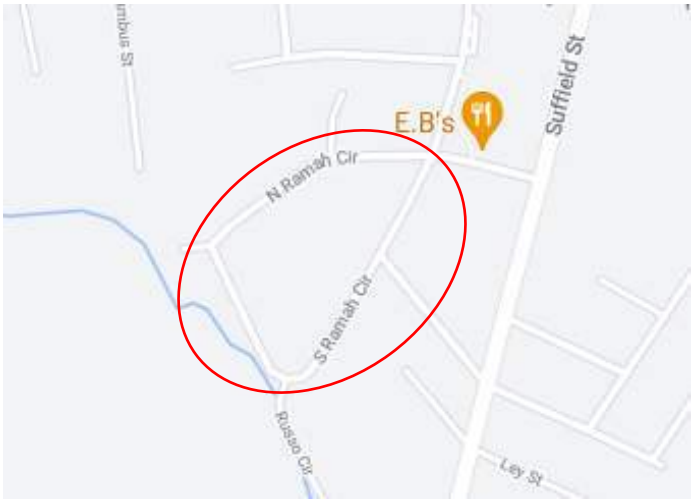
Location: Ramah Circle

Status: Planning

*Estimated Total Project Cost: $950,000

Residents and businesses along Ramah Circle have reported flooding along the road and within their properties. This occurs mostly along Ramah Circle North, and it appears that the drainage system is undersized, resulting in surcharging of catch basins and manholes during certain storm events. Flooding has impacted at least one business, Ron-Mar, Inc., with water in the parking lot and garage bay entrances to the building. The drainage system collects runoff from the northwest of Ramah Circle and developed properties along Springfield Street between Rowley Street and Columbus Street, which appear to be a significant contributor to flows. There is a stormwater discharge from Rowley Street that may be contributing to flows entering Ramah Circle.

Recommended next steps for this project include conducting CCTV investigations of the drainage network on Ramah Circle, a drainage study, and possible stormwater infrastructure replacement and upgrades, seeking to address historic flooding on the roadway.



Storm Drain Study and Upgrade Location

*Construction estimates subject to change based on findings within the design stage.

Liberty Street: Drainage Study Project

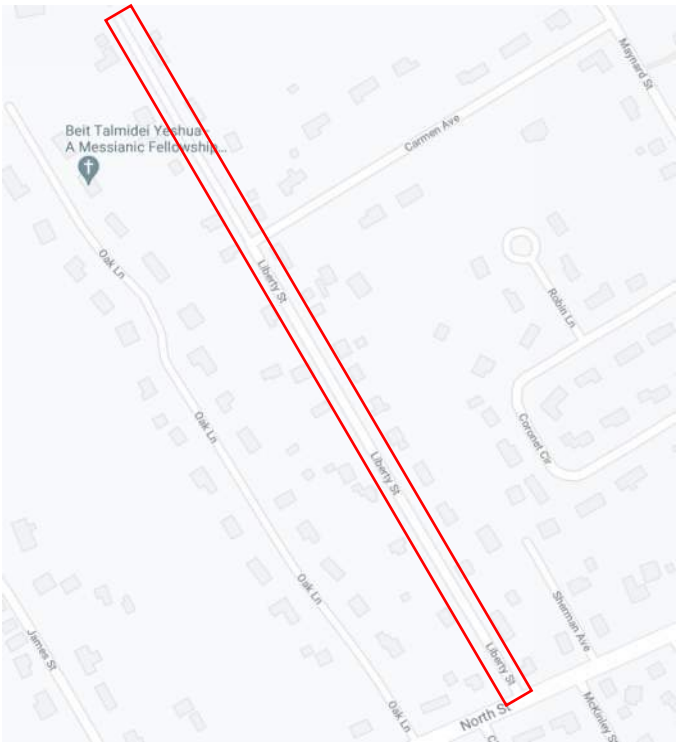
Location: Liberty Street

Status: Planning

*Estimated Total Project Cost: $1,000,000

Residents living on Liberty Street have reported street flooding on the northern portion of the street during large storm events. The drainage system on Liberty Street consists entirely of dry wells, with four located north of Carmen Avenue and two located at 81 and 82 Liberty Street.

Recommended next steps for this project include a drainage study of the Liberty Street area and, depending on the results of the drainage study, possibly constructing a stormwater conveyance system on Liberty Street.



Drainage Study Location

*Construction estimates subject to change based on findings within the design stage.

Hall Street: Drainage Study Project

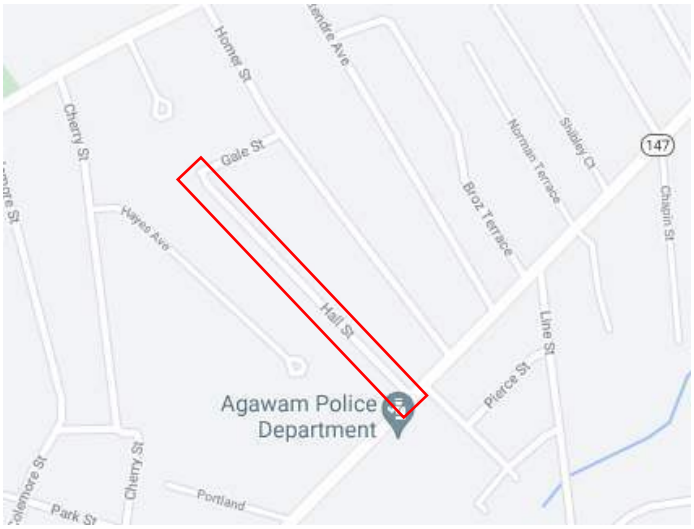
Location: Hall Street

Status: Planning

*Estimated Total Project Cost: $875,000

Residents living on Hall Street have reported street flooding during large storm events. All drainage on Hall Street appears to be country runoff; there are no known storm drainpipes or structures in the roadway.

Recommended next steps for this project include a drainage study of the Hall Street area and, depending on the results of the drainage study, possibly constructing a stormwater conveyance system on Hall Street.



Drainage Study Location

*Construction estimates subject to change based on findings within the design stage.

Ellison Avenue: Drainage Study Project

Location: Ellison Avenue

Status: Planning

*Estimated Total Project Cost: $625,000

Residents living on Ellison Avenue have reported street flooding on the southern portion of the street, particularly during the winter. This could potentially be a result of plowing, causing a buildup of snow and debris along the sides of the roadway that prevents stormwater runoff from flowing off the street. All drainage on Ellison Avenue appears to be country runoff; there are no known storm drainpipes or structures in the roadway.

Recommended next steps for this project include a drainage study of the Ellison Avenue area and, depending on the results of the drainage study, possibly constructing a stormwater conveyance system on Ellison Avenue, or developing a snow plowing plan for the roadway that maintains locations for stormwater runoff to flow off the roadway.



Drainage Study Location

*Construction estimates subject to change based on findings within the design stage.

James Street/Maynard Street: Drainage Study Project

Location: James Street/Maynard Street

Status: Planning

*Estimated Total Project Cost: $1,200,000

Residents living on James Street and on Maynard Street, between James Street and Carmen Avenue have reported street flooding during large storm events. All drainage on James Street and this portion of Maynard Street appears to be country runoff; there are no known storm drainpipes or structures in these sections of roadway. Topographically, both streets appear to be relatively flat, which can cause stormwater to pond on the roadway during storm events and can contribute to the deteriorating pavement conditions on both roadways.

Recommended next steps for this project include a drainage study of the James Street and Maynard Street areas and, depending on the results of the drainage study, possibly constructing stormwater conveyance systems on both streets.



Drainage Study Location

*Construction estimates subject to change based on findings within the design stage.

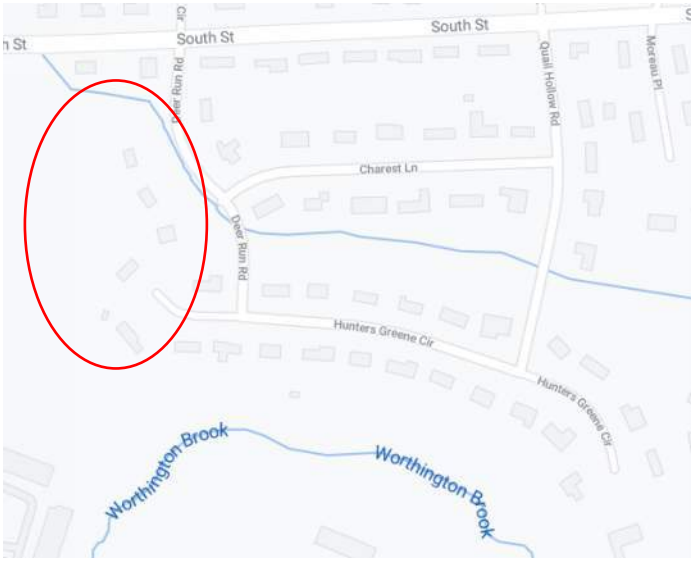
#4 Hunters Greene Circle: Maintenance and Drainage Study Project

Location: #4 Hunters Greene Circle

Status: Planning

*Estimated Total Project Cost: $30,000

There is a swale located along the western side of the property at 4 Hunters Greene Circle that is designed to convey stormwater to the north, to a stream that is a tributary of the Fourmile Brook. The owner of this property has reported flooding in the swale during large storm events. Initial site investigations indicated that debris had built up in the swale over time. Recommended next steps include removing any debris from within the swale that may be restricting flow, and possibly conducting a drainage study to conclude whether the swale is adequately sized to convey stormwater runoff from Hunters Green Circle to the stream.



Maintenance and Drainage Study Location

#59 Rowley Street: Outfall Repair Project

Location: #59 Rowley Street

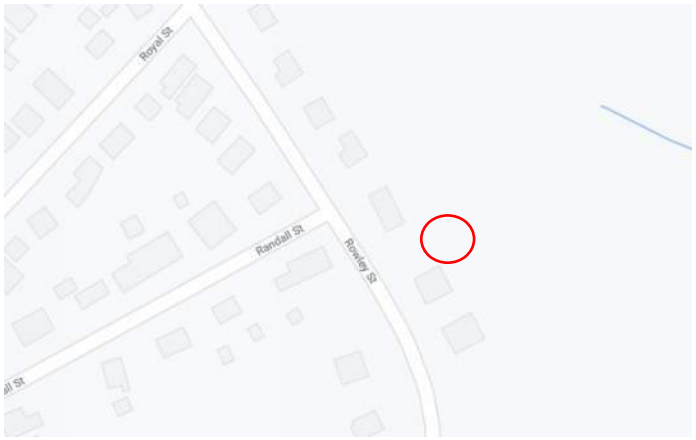
Status: Planning

*Estimated Total Project Cost: $80,000

Erosion of the embankment surrounding the concrete headwall of a storm drain outfall, identified by the Town as WB-36-325, has caused the entire headwall structure and connected 18-inch CMP to slide down the slope of the embankment. The displaced concrete headwall and outfall pipe will need to be replaced, and the eroded embankment surrounding outfall WB-36-325 will need to be repaired and stabilized.



WB-36-325



Outfall Repair Location

*Construction estimates subject to change based on findings within the design stage.

#43 Westford Circle: Outfall Repair Project

Location: #43 Westford Circle

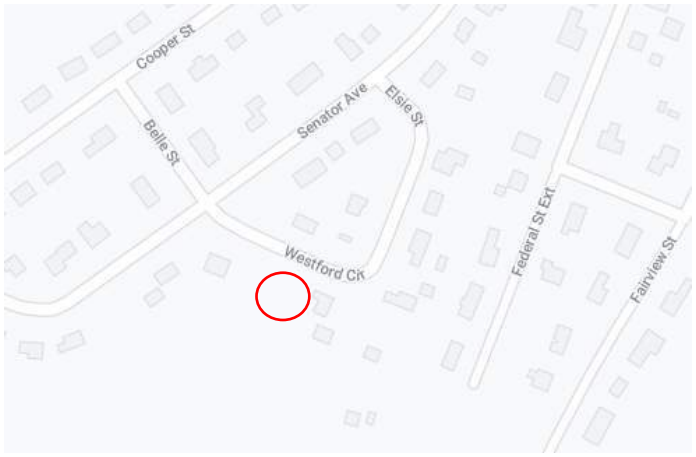
Status: Planning

**Estimated Total Project Cost: $80,000*

Segments of the reinforced concrete outfall pipe located on the western portion of the property at 43 Westford Circle, and identified by the Town as TM-41-738, have been disconnecting because of soil eroding beneath the pipe. The outfall pipe will need to be replaced and the eroded embankment surrounding the outfall will need to be repaired and stabilized.



TM-41-738



Outfall Repair Location

*Construction estimates subject to change based on findings within the design stage.

Parkedge Drive Outfall Repair and Stabilization Project

Location: Parkedge Drive

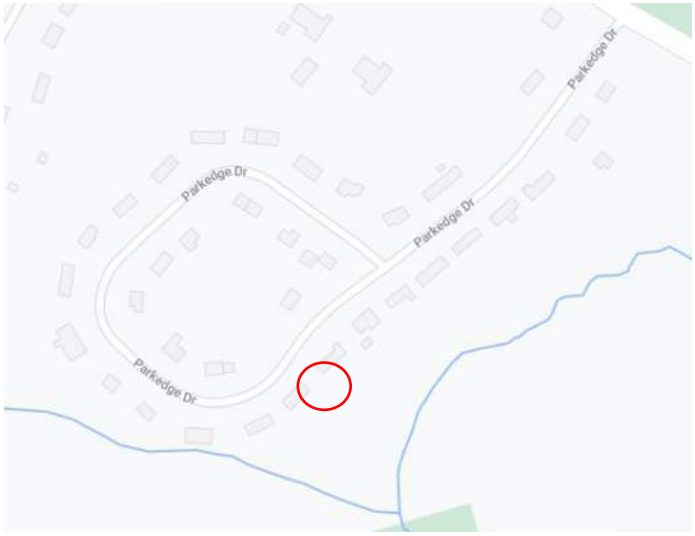
Status: Planning

****Estimated Total Project Cost: $40,000***

The drainage system in the southern portion of Parkedge Drive discharges into a stream via an outfall pipe located between #87 and #95 Parkedge Drive, which is identified by the Town as MAY-11-483. Site investigations have indicated that erosion caused by heavy storm events has widened the stream bank, such that the top of slope is now encroaching onto private property and may pose a risk to the structural integrity of the foundations of nearby residential buildings. Recommended next steps for this project include extending the outfall pipe approximately 20 feet to the southeast and installing structural fill to build out the top of the stream bank slope. Riprap slope stabilization and a new splash pad at the relocated outfall invert will need to be installed.



MAY-11-483



Outfall Repair and Slope Stabilization Location

*Construction estimates subject to change based on findings within the design stage.

Walnut Street Extension Streetscape Improvements Project

Location: Walnut Street

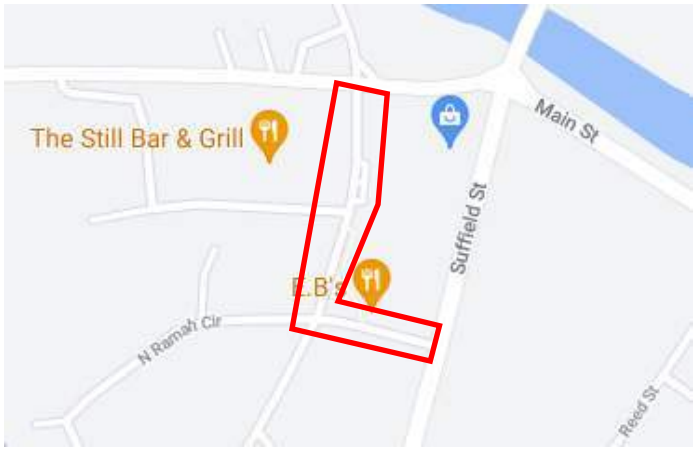
Status:

**Estimated Total Project Cost: $1,000,000*

Walnut Street Extension, between North Ramah Circle and Springfield Street, is relatively flat with poor drainage and a lot of connected impervious surfaces from abutting commercial properties. While the area does not experience significant flooding, future streetscape and utility improvements will support several opportunities to improve stormwater conditions and water quality. This includes removing and disconnecting impervious surfaces, deep sump catch basins, incorporating vegetated swales and bioretention areas along roads and walkways, and increasing increased tree canopy to reduce heat island effect. The redevelopment of the street corridor will improve parking and access for pedestrians and bikers, as well as provide outdoor seating adjacent to businesses. A streetscape improvement conceptual design was developed in 2016 but was not funded for design and construction. The conceptual design needs to be updated due to nearby road and traffic condition changes, and the revised conceptual design should include many of the above referenced stormwater improvements. Additionally, this streetscape redevelopment project should include highly visible stormwater improvements to highlight how aesthetically pleasing stormwater practices can be incorporated into the urban landscape, such as curb inlets to pocket bioretention cells that overflow back to a catch basin.



Streetscape Improvements Conceptual Design



Streetscape Improvements Location

*Construction estimates subject to change based on findings within the design stage.

PUBLIC OUTREACH PROJECTS

Town-Wide: Impervious Area Mitigation Evaluation – Municipal Properties

Location: Town-Wide

Status: Ongoing

*Estimated Total Project Cost: $40,000

As part of this Stormwater Master Plan, a Town-wide impervious area mitigation assessment was conducted to identify feasible impervious area mitigation strategies that the Town can integrate into its stormwater management program and public and private development and redevelopment projects over time. Impervious areas prevent precipitation and stormwater runoff from infiltrating into soils and the ground surface, resulting in increased stormwater runoff and reduced groundwater recharge.



Town of Agawam

Woodard & Curran recommends allocating $40,000 to evaluate and identify opportunities for impervious area removal, impervious area disconnection, and impervious area impact reduction on their 17 municipally owned properties that have more than one-acre of impervious area identified in the table below.

Property Name	Address	Parcel ID	Impervious Area (Acres)
Agawam High School	760 Cooper Street	H11 2 9	15.2
Robinson Park Elementary School	65 Begley Street	H15 5 11	7.9
Agawam Junior High School	1305 Springfield Street	E9 2 2	6.1
Agawam DPW	1000 Suffield Street	I7 1 2	6.0
Agawam Municipal Golf Course	128 Southwick Street	D10 1 6	4.8
James Clark Elementary School	65 Oxford Street	J4 1 6	4.5
Springfield Street Cemetery	0 Springfield Street	F10 6 11	3.4
Benjamin Phelps Elementary School	689 Main Street	L10 5 1	3.4
Clifford Granger Elementary School	31 South Westfield Street	E9 2 13	2.9
Roberta Doering Middle School	68 Main Street	J14 7 37	2.6
Perry Lane Preschool and Park	108 Perry Lane	J9 3 3	2.5
Bogarrti Park	0 River Road	L6 5 12	2.4
Agawam Town Hall	36 Main Street	J15 5 3	2.2
Cemetery	820 Main Street	K9 2 14	2.1
Agawam DPW	1347 Main Street	K5 2 8	2.0
Agawam Police Headquarters	681 Springfield Street	G12 10 4	1.5
Agawam Library	750 Cooper Street	H11 2 13	1.4
		Total	**71.9**

Various Basins: "How to Care for Your Stormwater Basin" Guidebook

Location: Various

Status: Planning

*Estimated Total Project Cost: $50,000

During the assessment of all Town-owned stormwater basins during the Fall of 2020, Woodard & Curran observed evidence of dumping and/or storage of materials on basin embankments at 25 of the 59 basins inspected. Several of the basins inspected were located within, or within proximity to, residential properties. In some instances, it appeared that residents had cleaned and maintained nearby basins.

This project would involve creating a "How to Care for Your Stormwater Basin" guidebook for the Town of Agawam to deliver to residents living near a stormwater basin. The intent of this guidebook would be to educate landowners on the dos and the don'ts of caring for a stormwater basin, and could include topics such as:

- How do stormwater basins work?;
- How to maintain different types of basins and basin features; and
- The negative effects of nutrients, sediment, and other pollutants in stormwater to address the yard waste, trash, construction materials, and other debris dumped into basins observed during assessments.



MGMT-46



MGMT-33

REOCCURRING ANNUAL ALLOCATION PROJECTS

Town-Wide: Detention Basin Maintenance

Location: Town-Wide

Status: Ongoing

*Estimated Total Project Cost: $50,000 per year

During the assessment of all 59 Town-owned stormwater basins during the Fall of 2020, Woodard & Curran observed that 55 basins had general maintenance deficiencies. Examples of the types of deficiencies observed include erosion at basin inlets and outlets, buried inlets and outlets, damaged trash racks on outlet control structures, sediment and leaf litter debris accumulating within impoundment areas, inlets and outlets, lack of vegetative growth, rodent holes on basin side slopes and impoundment areas, lack of maintenance for basin plantings, and damages basin to perimeter fencing.

Regular inspection and maintenance of detention basins is essential for keeping basins functioning as designed. The Town of Agawam should plan to have an annual budget to address the maintenance needs identified during Town-wide basin assessments.



Town of Agawam

Town-Wide: Outfall Repairs

Location: Town-Wide

Status: Ongoing

*Estimated Total Project Cost: $50,000 per year

In 2020, the Town of Agawam performed assessments of the Town's 355 stormwater outfalls in accordance with the 2016 Massachusetts Small MS4 General Permit Illicit Discharge Detection and Elimination (IDDE) program requirements. The outfall assessments included documenting and photographing the general condition of each outfall. Significant damage or deterioration was observed at 21 of the outfalls inspected, and general damages or maintenance concerns were observed at 124 other outfalls.

The Town of Agawam should plan to have an annual budget to address the damages and maintenance needs identified during Town-wide outfall investigations.



Town of Agawam

Town-Wide: Storm Drain CCTV Inspection & Heavy Cleaning

Location: Town-Wide

Status: Ongoing

*Estimated Total Project Cost: $50,000 per year

The Town of Agawam owns and operates approximately 120 miles of storm drainpipes. During the closed-circuit television (CCTV) investigations of the Town's storm drainpipes during the Winter of 2021, Woodard & Curran's subcontractor, BMC Corp., inspected approximately 20,200 linear feet, or 3%, of the Town's storm drainpipe segments.

The Town of Agawam should aim to inspect approximately 15,000 to 20,000 linear feet of storm drainpipe per year. These CCTV inspections will be crucial for proactively identifying structural and operations and maintenance-related pipe defects within the Town's storm drain network and will ideally allow the Town to develop rehabilitation solutions prior to system failure.



Town of Agawam

Town-Wide: Storm Drain Investigation Repairs

Location: Town-Wide

Status: Ongoing

*Estimated Total Project Cost: $100,000 per year

During the Town's Storm Drain CCTV Inspection Program, the Town of Agawam is likely to identify structural and operations and maintenance-related pipe defects within the Town's storm drain network. The Town should work to develop rehabilitation solutions for these defects prior to system failure.

The Town of Agawam should plan to have an annual budget to address defects identified during ongoing Town-wide CCTV investigations. Rehabilitation measures that would be covered by this budget include, but are not limited to:

- Heavy cleaning and follow-up CCTV investigations;
- Trenchless rehabilitation;
- Open cut repair (dig and replace); and
- Outfall repair.



Town of Agawam

Town-Wide: Illicit Discharge Detection and Elimination Program

Location: Town-Wide

Status: Ongoing

*Estimated Total Project Cost: $100,000 per year

In accordance with the 2016 Massachusetts Small MS4 General Permit Illicit Discharge Detection and Elimination (IDDE) program requirements, the Town of Agawam is obligated to conduct investigations of their storm drain infrastructure with the intent of locating, verifying, and removing illicit discharges.

The Town of Agawam should plan to have an annual budget to fulfill the requirements of their MS4 General Permit IDDE program. Remaining IDDE investigation efforts that would be paid for under this allowance include dry weather investigations of the storm drainpipe networks that discharge to each of the Town's 355 outfalls, referred to in the Permit as catchment investigations, wet-weather screenings of most, or all, Town-owned outfalls, and illicit discharge notification, abatement, and removal confirmation support.



Town of Agawam

Town-Wide: Municipal Storm Drain System Hydrologic & Hydraulic Model Development

Location: Town-Wide

Status: Ongoing

*Estimated Total Project Cost: $150,000 per year

To better understand sources of flooding and deficiencies present within the municipal drain system, the Town should consider developing a town-wide hydrologic and hydraulic model of its drainage system. The model would consider specific factors such as land use, imperviousness, and hydrologic soil groups to calculate a reasonable curve number which would be used in conjunction with updated precipitation data to calculate runoff from each of the Town's sub-watersheds during various storm events and scenarios. The model would route the calculated runoff through the system, identifying conveyance deficiencies and strategic locations for storm drain improvements.

The Town of Agawam should plan to have an annual budget to continuously develop a comprehensive hydrologic and hydraulic model of the storm drain system. This effort should begin in areas with known drainage deficiencies.



Town of Agawam

APPENDIX H: COMMUNITY ENGAGEMENT SUMMARY

Community Engagement

To complement the engineering analysis and regulatory review work of this Master Plan, Town officials worked with PVPC, Enchanter Circle, and the Hitchcock Center on a community engagement program. This work fortunately coincided with an ongoing school program with Cooler Communities (funded the Harold Grinspoon Foundation), which advances understanding about the need for energy conservation and other mitigation activities. The MVP funded community engagement activities focused on the schools, but also included the community at large through a virtual Earth Expo event on April 28 to which families and other community members were invited and a community-wide survey. More information on the specific elements of the overall community engagement program follows.

High school video

In November and December of 2020, PVPC worked with a group of four Agawam High School students to script, direct, and produce two videos: one on how the Town of Agawam currently manages its stormwater, and the other on the local impacts of climate change and increased precipitation on the Town's stormwater management infrastructure. These two short videos were posted on the Town's media webpage, shared with the fifth grade classes as an introduction to Enchanted Circle Theater's *Where Does Your Water Go?* art residence program, and shown again as part of the Town's programming during the virtual Earth Expo event. See videos at:
https://drive.google.com/file/d/1ymLVO93g8JjFK4f26DHVgq96pp6xrnH9/view
https://drive.google.com/file/d/1JBjyDqFdEApFnvc_cWGXa7o21DYOCr8J/view

School residency program

Enchanted Circle and the Hitchcock Center for the Environment facilitated an 8-day artist-in-residence program in 12 5th grade classrooms at the Doering School in Agawam. Entitled, *Where Does Your Water Go?,* students and teachers worked with teaching artists and scientists to develop public art that relayed important messages - keep our waterways clean, and storm drains are connected to our ecosystems and our animal life.



Storm drain art and Earth Expo event

Of the over 200 pieces of storm drain art created by Doering School students, 48 were selected to be part of Agawam's Cooler Communities Challenge and were on display at the Agawam virtual Earth Expo event on April 28th. At the Expo, Enchanted Circle teaching artists introduced attendees to the residency and the art work, led storm drain trivia quiz, and facilitated voting on the artwork. See following links:
https://coolercommunities.org/agawam/
Digital compilation video: https://youtu.be/9rSFCInVtXo
Storm drain art design finalist voting: https://padlet.com/gmicchia/55g3th36n7mytcob

As part of the Earth Expo, PVPC and engineering consultants Woodard & Curran also presented virtually on the stormwater master plan and regulatory review work for climate resiliency with an introduction to the evening from Mayor Sapelli. See: https://www.youtube.com/watch?v=RF9YBZ4ZTZY



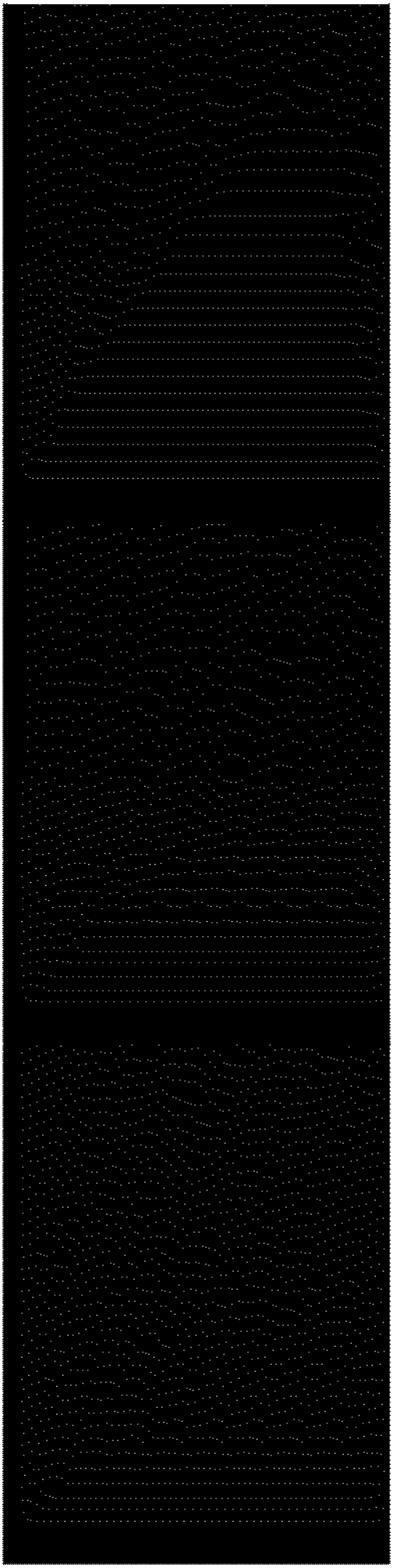
Community survey

Conferring with Town officials and project engineering consultants, PVPC prepared an 11-question survey to obtain a better sense of lived experience and changing weather and to gauge support for local efforts in adapting to climate change. The Town publicized the survey across various departmental social media accounts and newsletters (including the public library, schools, and Council on Aging). The survey was posted for one month and closed on June 4 with a total of 68 responses. While respondents represented every neighborhood in Town, more than half identified as living within the Feeding Hills neighborhood (51.47%). Following are several highlights from the responses:

- Respondents were largely in agreement that they were experiencing climate impacts already in Agawam, and approximately 56% indicated they were somewhat or extremely concerned about rainfall and flooding events in town.
- At least half of all respondents were extremely supportive of each of the identified "nature-based solutions," with the exception of adopting LID policies and regulations and funding the Town to take over private stormwater detention basins in poor repair.
- There was strong support for the Town to pursue "nature-based solutions" (63%), while only some respondents indicated a preference for traditional infrastructure solutions (13%).
- Eighty-two percent of respondents support the Town in requiring development projects to account for future projected rainfall, rather than current rainfall amounts, while 79% said they were somewhat to extremely supportive of funding projects aimed at improved stormwater management.
- Overall, the most common concern that survey residents seemed to have was the impact these types of projects would have on their tax rates.

The art shown above and at right are among the top 12 5th grade student storm drain art designs selected by attendees at Agawam's Earth Expo event on April 28th. These winning designs will be include on banners to be installed at the Doering School, the public library, and Schools Street Park for the public to enjoy.





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